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Structural Steel Leading

A New Tonnage Record for 1911

Marked Activity of Steel Corporation Mills—Further Price Cutting

More emphasis has been put this week on the continued operation of Steel Corporation mills at a better rate than the average of its competitors' plants. As has been previously pointed out, this is due in large part to the excellent export trade of the Corporation, but in some lines it appears to have been increasing in recent weeks its share of the domestic business. An official statement issued on Tuesday says that the Steel Corporation has received larger specifications for prompt shipment in August than in any previous month this year and intimates that unfilled orders for the month will show a "fair increase."

Structural steel shapes are easily the most active of finished products. The mills, however, get more satisfaction from the volume of business than from the prices which underlie recent large contracts for buildings and bridges. It is estimated that, with the maintenance of the present rate through the year, the 1911 total will exceed that of the record year 1906 in fabricated steel contracts by 10 to 15 per cent. In view of their very heavy bookings, leading fabricators are now naming figures more in line with a 1.35c. basis for shapes.

At Chicago the ordinance limiting the height of buildings goes into effect this week and this has hastened the taking out of permits on several large projects. These, together with new office buildings now under construction, represent a total value above $18,000,000.

Further evidence of the strictness with which railroads are limiting expenditures has appeared this week in the frog and crossing and track supply trades, where specifications, conspicuously in the case of the Eastern lines, have been cut sharply. Three rail sales are reported by Steel Corporation mills—4500 tons to the Chesapeake & Ohio, 9450 tons to the Illinois Central and 5900 tons to the Texas & Pacific. The Grand Trunk is in the market for 10,000 tons of rails which may go to a seaboard mill as they are wanted for delivery in New England.

Reports from the wire trade show that August has been a month of greater activity than has been indicated in market reviews of the past few weeks. Much of the selling has been done with a quietness bearing out reports of concessions by certain producers. On wire nails a $1.65 price per keg, representing a reduction of $1 a ton, has been announced by one seller as applying to prompt orders, but it only met quiet cutting already in progress.

The Eastern plate trade is taking a keen interest in the four vessels which are to be built for the trade between the Atlantic and Pacific coasts. The plates will amount to 30,000 tons and the shapes to 10,000 or 12,000 tons.

The lower prices lately reported in wrought pipe and tubes appear to be largely made by jobbers. The guarantee on prices recently made by certain mills extends to October 15 and applies to business closed after August 15.

The competition on steel bars has been sharper in the Chicago district, and the Pittsburgh base has been quite generally disregarded. As low as 1.33c. delivered is reported, or the equivalent of 1.15c., Pittsburgh. In general 1.20c., Pittsburgh, is the basis in Central and Western districts and a good part of the bar sales in the East has been at 1.25c., Pittsburgh.

In semi-finished steel there has been no important business, but the $21 Pittsburgh basis has been shaded and mills have absorbed a $1 extra in some cases.

The situation in foundry pig iron for 1912 is developing slowly. More consumers are testing the market, but furnaces are not meeting their views. Some sales have been made at current prices, for the remainder of the year, with the privilege of taking some of the iron in January and February. From Buffalo sales of several thousand tons have been made to Canadian foundries, American iron being preferred even at $1.50 to $2 a ton above the delivered price of the higher phosphorus Middlesbrough, England, grades. Southern iron has made a hard pace for Northern furnaces in central territory recently and has prevented the latter from establishing advances.

The old material market is weaker, particularly in the East, where steel works, with two or three months' stocks on hand, have reduced their bids by 50 cents. In the Chicago district much more railroad material is offered than the market can absorb.

Germany's Industrial Policy as a Model

A well-known New York financier who returned last week from Europe referred in an interview to the industrial and commercial expansion of Germany. He spoke particularly of the evident satisfaction of German labor with existing conditions and of the steady increase in the country's wealth and added: "In Germany the law and government favor the plan of industrial combinations. Trade and commerce are encouraged and not harassed or stifled by vexatious governmental methods. I believe we can learn considerable from careful study of German economic methods and particularly from the manner in which Germany deals with labor problems."

If the iron and steel trades of Germany are an index of what is going on in other industries in that country, it will not be long until the soundness of the expansion there will cause serious questioning. The government's toleration if not actual encouragement of the pools in the steel industry which have controlled an important part of the production for a number of years has sometimes been referred to as an example for the United States. That the methods of the German Steel Works Union have encouraged the building of plant beyond the requirements of the country and a normal export trade will hardly be questioned. In the past year attention has been called repeatedly to the new capacity in blast furnaces, steel works and rolling mills which is coming forward against the expiration of the present agreement among the manufacturers next year.

Some of these additions have been spoken of as the preparation of various members of the Steel Works Union to secure larger allotments in any agreement which may be made in 1912. This can only be a secondary reason for the building of so great an amount of new plant. Undoubtedly the large firms which are competing in plant extension are counting on a continuance of the scale of increase in the consumption of German iron and steel products which has been so marked in the past five years, as indicated by a production of 10,875,000 metric tons of pig iron in 1905 and 14,227,000 tons in 1910, with a rate so far this year of 15,400,000 tons. Apart from the special conditions governing the German iron and steel trade which make it possible to control the prices of most products at home and thus to make sharply competitive prices in outer markets, the expansion of the industry in Germany has shown a parallel to that in the United States. There has been unbounded confidence apparently in the indefinite continuance of the rate of increase shown in the curves of the statistical charts. It seems inevitable, therefore, that the German steel manufacturers will yet find themselves in the condition now so embarrassing here, with a capacity more than one-half greater than home consumption plus exports.

Just how far the measure of control of the steel market exerted in this country in the past few years has affected the building of new capacity it would be difficult to say. It is certainly early to hold up the German policy of encouraging control of an industry by the producer as an example for imitation. The full story of syndicate operations in the steel industry there has not yet been told. From present indications, however, data will soon be available that will put a less favorable aspect on this method of expansion. The preliminary fencing for position against the renewal of the Stahlwerks Verband agreement in 1912 may show that the industry has even now gone past the danger line.

Cotton Planters Combine to Maintain Prices

It is not surprising that cotton planters are so worried by the rapid decline in the price of their product that they are combining to check the downward movement. They always have a hard fight with nature in endeavoring to raise a crop and deserve to secure good returns for their labor and the hazard of their capital. The individual planter has the sympathy of his fellow countrymen in his struggle for existence, and the nation itself is benefited when planters as a whole are prosperous and able to supply themselves and their families with not only comforts, but luxuries. The short crops of the last two years brought very good prices, and those who were not compelled to sell their product as soon as it was marketable enjoyed the satisfaction of making a good profit. But a great change has occurred this year. An unusually large cotton crop seems to be assured and this has adversely affected the price. At this time last year the price of cotton was about 16⅝ cents per pound for spot and 13⅜ to 14⅜ cents for futures, while the past week the price was 12⅜ to 13 cents for spot and 11¼ to 11¾ cents for futures. The decline is so heavy that the planters are dismayed. They are convinced that stocks of cotton are so small everywhere that even if the United States does produce an exceptionally large crop this year it will all be needed to put the world's stocks in normal shape. It is therefore

quite natural that they should feel like taking concerted measures for maintaining prices until the crop can be distributed.

The remarkable feature of this movement to hold up cotton prices, however, is that it was not started by planters in private life, but by men of official prominence who have been active in working up public opinion in direct opposition to such a procedure. At the recent session of Congress much concern was manifested with regard to the disposition of manufacturers to maintain prices, either through some kind of an understanding with one another or because a high tariff was presumed to enable them to do so. The impression was then sought to be made upon the public that this concern grew out of the deep sympathy felt for that rather indefinite but widely-known individual, the consumer. We may be mistaken, but according to our recollection the ostensible aim of those in control of Congressional activity was to secure lower prices for every consumer. It seems to us that the purpose of the "farmers' free list" was to make certain articles cheaper for the farmer and planter; the object of the wool bill was to give the consumer cheaper woolen goods; the point of the cotton bill was to secure cheaper cotton goods for the consumer, and the object of numerous investigations was to break up combinations of capital or amicable relations among manufacturers so that the consumer might secure cheaper manufactured products generally. It would therefore be presumed that those who were prominent in this Congressional activity would frown upon any movement that would prevent a commodity of such general consumption as cotton from becoming as cheap as nature and unrestrained trade conditions might permit. But the remarkable spectacle is presented of some of these Congressmen taking the lead in the movement to hold up the price of cotton.

Announcement is made that in Washington, D. C., on August 23, the very next day after the adjournment of Congress, the Representatives and Senators from seven cotton-growing States held a meeting and resolved to send out circulars urging all planters to hold their cotton for 13 cents a pound, and other circulars to Southern banking houses requesting that every possible aid be given to the planters to enable them to maintain this policy. Although cotton brokers assert that Southern planters themselves are selling ahead through cotton exchanges as a hedge, lest when their cotton is ready for shipment the price may be lower than can now be obtained on future contracts, yet the Congressmen who participated in this conference claim in an open statement that an effort is being made, "principally through the instrumentality of the speculative element of the New York Cotton Exchange, to break down the price of cotton," and this they now seek to prevent. They even go so far as to ask the president of the Farmers' Union and officials of other cotton planters' organizations to get their local unions and other subordinate bodies to advise the growers generally to hold their cotton for 13 cents "and to continue to demand that price until by a convention or agreement a different way shall be suggested."

It would seem almost incredible that men who had for months been engaged in a campaign to upset industries and break down prices would be able to effect such a speedy change in their mental attitude. Even though their personal fortunes may be threatened by the fall in cotton, it would appear that respect for public opinion would prevent them from taking the lead in urging action which, although it may not be contrary to statute, is nevertheless in defiance of the spirit of the law which they have so zealously been endeavoring to have enforced against others. It seldom happens that persecutors have the tables turned so quickly upon themselves. Perhaps the unpleasant position in which the cotton-growing Congressmen now find themselves may modify their views with regard to other business interests when they again assemble to make laws for the nation. They will unquestionably be on the defensive if their scheme to make cotton dear should prove successful.

Labor and the Efficiency System

Molders employed at the United States Arsenal at Watertown, Mass., have gone on strike because of the presence in the foundry of efficiency experts. In explanation of their action one of the strikers is quoted as saying: "When a skilled mechanic of years' experience in the work in hand is stood over by a man who is incapable of performing the task himself, or even of intelligently directing a workman how to perform such a task, and is told by that man that he should have accomplished the task in less than half the time taken to do it, the limit of human endurance is reached."

Such an attitude toward improved methods of production is regrettable, not only on the part of the owner, in this case the Federal Government, but on the part of the workmen themselves. An engineer rarely is able to do the work of the men whom he directs in their efforts, but he understands better than most of them methods and conditions attending production. The efficiency expert is an engineer trained along special lines, in order that he may discover and apply means of shortening the time of producing given results, and at the same time of maintaining or improving the quality. The men whose labors come under his eye are benefited if they have the ability and willingness to meet the new conditions. The incompetent may be put aside to make place for more able material. But the survivors, who in most works constitute the large majority of the force, become a more valuable unit industrially, and in the long run each will receive a larger return for his labor, provided, of course, he will continue to apply the knowledge gained from his contact with the efficiency engineer. Workmen will realize this better as time goes on.

The workman quoted above omitted to say, and may not have known, that a chief use of the stopwatch is to inform the operator himself of the variations in his own speed. It has been shown that a workman in one case will take two or three times as long to perform one of the series of operations entering into the finishing of a piece, as he takes to perform the same operation on the succeeding piece. The stopwatch man, by comparing the sum of the minimum components with the average time required to do a piece, is often able to show the workman that on his own record he can turn out more work by studying to bring his average time for a piece closer to the sum of his minima. There may be unreasonable time rating, and often is, and it will not do to start out with any expectation that a workman can reduce his average on a series of operations to the sum of his minima; but the history of studies with the stopwatch

is that many workmen have been surprised at what they have been shown of their own capacity to increase output and have gladly made use of the information to add materially to their earnings.

The details of the cause of the Watertown strike are not available, but it may be stated as a general proposition that the owner and his efficiency man should handle the application of the system with all possible consideration for the men. It is difficult to imagine an industrial relationship in which more tact is necessary for the avoidance of misunderstanding and friction. Criticism should be meted out quietly and only after mature decision. The co-operation of the workman should be sought, and his suggestions should be given their full value and the credit should be frankly given him if his ideas are adopted. These factors seem self-evident; nevertheless in some cases they are not given due prominence.

Lake Shipbuilding at Low Ebb

The outlook for the shipyards on the Great Lakes is far from bright. An officer of the leading shipbuilding company has been credited with the prediction that in the next 12 months not a new lake carrier will be built. It is to be doubted if any such statement was made, for the year has not been known, since lake traffic assumed important proportions, when no addition to the fleet was made. Moreover, it is the history of lake vessel building that when the outlook is darkest and the cost of new boats the lowest, capital has been attracted to invest in floating property. At the same time the conditions in the lake freight market, which were acute in 1910, have been even more unpromising this year, and it must be admitted that the prospect that 1912 will be a year giving full employment to the ore fleet is far from good.

Twenty bulk freighters were launched on the lakes in 1910, with a carrying capacity of 3,900,000 tons in a season. In the nine years ending with 1910 the vessels carrying coarse freight which were added to the fleet had a capacity for carrying over 41,000,000 tons of iron ore in a season. The boats built this year have probably added 500,000 tons to this total. Here is an addition to the ore fleet in ten years capable of bringing down all the ore shipped by water in 1909 and within 1,000,000 tons of the record water shipments of 1910. Vessel building, like blast furnace and steel works building, has been overdone and there must be a period of rest for the absorption of the surplus. At the same time it is to be remembered that pessimism is nowhere deeper dyed than in the lake trade, when conditions are forbidding, and that in 1904 and in the dark years following the panic of 1893 new work was placed just at the time when prophecies gave least room for hope. Today, with so much of the ore going to consumers whose carrying capacity is considerably short of their shipments, there should continue to be additions to the fleets of the steel companies. And this may be expected to go on even at the expense of the merchant vessel interests, just as the steel companies have increased their blast furnace capacity with the certainty that merchant furnaces which had been selling them iron would lose their market in large part, if not altogether.

The Des Moines Bridge & Iron Company, Pittsburgh, has received a contract for the building of a 160,000-gal. hemispherical bottom steel tank on a 150-ft. steel tower at Lakeland, Ky., where the State Insane Asylum is located.

Correspondence

Mr. Thyssen's Remarks at the Brussels Conference

To the Editor: In Vol. 88, No. 5, of your paper you give a report of the proceedings of the conference at Brussels. As far as my personal remarks are concerned, their meaning is not given quite clearly. Consequently I have the pleasure to repeat them to you more accurately, viz.:

"I ask your kind permission to address a few remarks to you just to say a few words of excuse for the bad behavior we showed, perhaps, in the past, when our competition, following the ideas of Judge Gary, was perhaps too sharp. (This remark is, of course, meant somewhat ironically.) In order to make this excuse more clear to you, I should like to compare the activity of each country with a boiler. Each line of public activity is represented by a pipe line. There are countries which have big colonies; there are countries which have free land to develop; and other countries, again, which have no colonies and no land to develop. It is natural that in the country having large colonies the pipe line which this line of activity runs through must be very big; and other countries which have no colonies and consequently not this pipe line must have a bigger pipe line, for instance, for their industrial activity in order to have an outlet for their surplus of steam. I think your committee should try to come to an arrangement so that there never should be any undue pressure in any boiler representing the activity of each nation. Then you will have a perfect result." FRITZ THYSSEN.

Gewerkschaft Deutscher Kaiser, Bruckhausen-Rhein, August 18, 1911.

The Hopkins & Allen Arms Company's New Officers

The Hopkins & Allen Arms Company, Norwich, Conn., effected its reorganization with the new owners August 22. President A. H. Brewer resigned as president and director, and Gardiner Hall, John Eccles, John C. Averill, E. E. Perry and Archibald Mitchell, directors, also resigned. New directors were chosen as follows: William A. Watts, New Haven; George E. Matthies, Seymour; M. C. Mason, Rockville; George E. Avis, New Haven; Charles E. Roberts, New Haven; Franklin S. Jerome, Norwich. Harris Briggs and Charles B. Lee, members of the old board, were continued.

The following officers were elected by the directors: William A. Watts, president; George E. Matthies, vice-president; Charles B. Lee, secretary; M. C. Mason, treasurer; George E. Avis, general manager. Mr. Watts is president and treasurer of the Bronson-Townsend Company, wholesale hardware, New Haven; Mr. Matthies is assistant treasurer of the Seymour Mfg. Company and secretary and treasurer of the Seymour Trust Company; Mr. Mason was purchasing agent of the Hockanum Mills Company, Rockville; Mr. Avis was for years connected with the Winchester Company as foreman in the barrel-making department, later succeeding his father as contractor of this department, which is one of the most exacting and important branches of gun manufacture; Mr. Lee has for years held the position of secretary of the old company. E. E. Perry has resigned and Charles E. Roberts, a former salesman for the Winchester Company and latterly in like capacity for the J. Stevens Arms & Tool Company, has been appointed sales manager. Frank Jewett, of Hartford, stated to be one of the best gunmakers ever employed in the Winchester plant and a mechanic of unusual ability, has been appointed superintendent. The newly-elected officers took charge of the management at once.

The Cincinnati Iron & Steel Company, Cincinnati, Ohio, is distributing a large sheet entitled "Cincinnati's Official Package Car Guide No. 1." This is compiled by the Receivers' and Shippers' Association of Cincinnati, and is the forerunner of a book to be gotten out by that association for the purpose of showing the railroad lines by which delivery can be made in practically every town in the United States of package cars.

The Steel Corporation's Current Business

Following the monthly meeting of the directors of the United States Steel Corporation August 29, President James A. Farrell issued a statement showing operations for the first three weeks in August, which is as follows:

"The unfilled orders as at August 1 showed 3,584,000 tons (exclusive of intercompany business of 850,000 tons), a gain over June 30 of 225,000 tons. Since August 1 new business has been freely offered, and, notwithstanding shipments in August have been large, the bookings up to the 20th (the latest date to which data have been compiled) show a fair increase.

"The steel-producing plants of the corporation are operating about 78 per cent. of their capacity, while a number of the finishing departments of the various companies are operating 85 per cent.

"The daily bookings of the corporation from January 1 to August 20 show an average increase of 7750 tons, as compared with the same period in 1910.

"Specifications for prompt shipments in August are larger than for any previous month this year, and the outlook is all that can be desired."

A number of patents were granted August 8 to William H. Bristol, of the Bristol Company, Waterbury, Conn. One covers a speed recorder, comprehending a circular revolving chart on which a continuous speed record may be obtained. Another covers a belt fastener for round belts and the essential feature comprises an internally threaded sleeve provided with a slot intended to cut the threads on the end of the belt as it is turned into the fastener. A third covers a combined clock and shock recorder, this similarly having a rotatable chart and a flexible vibrating arm with a marking point at one end of it. The fourth covers a temperature compensating device for use in electrical apparatus adapted for minute currents such as electric pyrometry. A patent was also granted to Mr. Bristol August 15 on a pressure indicating and recording apparatus, in which pressure changes are made to cause fluctuations to a contained liquid carrying a float with indicating and recording devices.

A piped rail, which was broken into a number of pieces, was responsible for the wrecking of a fast passenger train of the Lehigh Valley Railroad on a trestle at Manchester, N. Y., August 25. Thirty-seven lives were lost. The railroad's chemists have taken pieces of the broken rail for analysis. The New York State Railroad Commission also had an expert at the scene of the wreck and will make an independent examination of a portion of the rail. Near Kirkwood, Ohio, five coaches of a Cincinnati, Hamilton & Dayton train were derailed on August 27. It is stated that the engine struck a defective rail and was thrown from the track.

A cablegram of August 27 reported a more serious aspect of the labor troubles in the metal-working industries of Germany. The employers last week locked out 60 per cent. of the metal workers at Dresden and at Chemnitz. The trouble started early in the present month when 10,000 metal workers at Leipzig and 9000 in the Thuringian district were locked out because some of the employees had gone on a strike. The national organizations of employers and employees took up the matter, but failed to make a settlement, and the extensive lockouts at Dresden and Chemnitz resulted.

The one Niagara furnace at North Tonawanda, N. Y., which is now in blast will be blown out about September 15. Of the three Buffalo Union Furnace Company stacks two are now running, and both Wickwire and both Buffalo & Susquehanna furnaces are active. The Lackawanna Steel Company has had three out of seven furnaces in blast this month. The New York State Steel Company furnace, which blew out July 2, is still idle and the steel plant is shut down.

The American Railway Association report shows that the number of idle freight cars in the United States declined from 128,088 on August 2 to 104,170 on August 16, a falling off of 23,918. On August 17, 1910, the total number of idle cars was 73,679.

Personal

J. B. Keiser, vice-president and general manager, and H. S. Geismer, Chattanooga district manager of the Southern Iron and & Steel Company, who have tendered their resignations, will organize September 1 the Keiser-Geismer Engineering Company with offices in Birmingham, Ala., and Chattanooga, Tenn., for consulting work covering coal and iron mines, blast furnaces and steel plants in Alabama, Georgia and Tennessee.

Arthur R. Shurtleff, president of the Imperial Belting Company, 166-68 West Kinzie street, Chicago, is at present combining business with pleasure on a trip to Europe.

John M. Manley, who was recently elected manager of the Cincinnati Commercial Association of Cincinnati, Ohio, has decided not to accept this position, but will retain his present one as local secretary of the National Metal Trades Association.

S. Severance, who has been president and manager of the S. Severance Mfg. Company since its formation, manufacturing spikes and rivets at Glassport, Pa., will sever his connection with that company September 1.

John Fritz, Bethlehem, Pa., whose active interest in engineering developments in iron and steel has long been so surprisingly sustained, entered upon his 90th year August 21.

J. Campbell Maben, Jr., has been elected a director of the Sloss-Sheffield Steel & Iron Company to succeed H. O. Seixas, deceased.

James Campbell, St. Louis, a vice-president of the Frisco Lines, with important interests in the Laclede Gaslight Company and other enterprises, has been elected to fill a vacancy on the board of directors of the Republic Iron & Steel Company and has been made a member of its executive committee. The vacancy on the board of directors caused by the death of John W. Gates will not be filled until the annual meeting of the stockholders in October.

J. H. Sheadle, of the Cleveland-Cliffs Iron Company, Cleveland, Ohio, sailed August 29 for a several weeks' European trip.

A. W. Dee has resigned his position as secretary and general manager of the National Rolling Mill Company, Mansfield, Ohio. His successor has not yet been appointed.

George R. Bentley, who has been connected with the Central Iron & Steel Company, Harrisburg, Pa., for the past 12 years as general superintendent, will sever his connection with the company October 1.

The Pittsburgh Testing Laboratory, Pittsburgh, Pa., announces that it appointed, on August 26, R. T. Miller acting manager of its Chicago office, 1330 Monadnock Building, succeeding James A. Lister, whose connection with the company ceased on that date.

American Iron and Steel Institute Directory

The American Iron and Steel Institute has sent out a biographical directory, prepared by Hon. James T. McCleary, its secretary, and Assistant Secretary Howard H. Cook. It contains 266 pages 4¾ x 7 in. and is handsomely bound in flexible leather. Sketches with portraits are given of 243 members of the institute and there are 14 additional sketches unaccompanied by portraits. The frontispiece is a portrait of the president of the institute, Judge E. H. Gary. Only those familiar with the difficulty of extracting such information about themselves from busy men can appreciate the labor involved in the preparation of this volume, and the compilers have done the iron and steel manufacturers of the country a service in thus acquainting them with each other. It is stated in the preface that the circulation of the directory will be limited to the members and to some of the leading iron and steel manufacturers of Europe.

The Griscom-Spencer Company, 90 West street, New York, is now selling agent for the Bundy steam trap and other specialties manufactured by the Nashua Machine Company, Nashua, N. H.

The Iron and Metal Markets

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics.

At date, one week, one month and one year previous.

	Aug. 30, 1911.	Aug. 23, 1911.	July 26, 1911.	Aug. 31, 1910.
PIG IRON, Per Gross Ton:				
Foundry No. 2 standard, Philadelphia	$15.00	$15.00	$15.00	$16.00
Foundry No. 2, Valley furnace	13.50	13.50	13.50	14.00
Foundry No. 2 Southern, Cincinnati	13.50	13.50	13.25	14.25
Foundry No. 2, Birmingham, Ala.	10.25	10.25	10.00	11.00
Foundry No. 2, at furnace, Chicago*	14.50	14.50	14.50	16.50
Basic, delivered, eastern Pa.	14.75	14.75	14.50	15.00
Basic, Valley furnace	13.00	13.00	13.00	14.00
Bessemer, Pittsburgh	15.90	15.90	15.90	15.90
Gray forge, Pittsburgh	13.90	13.90	13.90	14.15
Lake Superior charcoal, Chicago.	16.50	16.50	16.50	18.50
COKE, CONNELLSVILLE, Per Net Ton, at Oven:				
Furnace coke, prompt shipment.	1.50	1.50	1.50	1.60
Furnace coke, future delivery..	1.60	1.60	1.65	1.75
Foundry coke, prompt shipment.	1.85	1.85	1.85	2.15
Foundry coke, future delivery..	2.10	2.10	2.00	2.25
BILLETS, &c., Per Gross Ton:				
Bessemer billets, Pittsburgh	21.00	21.00	21.00	24.50
Forging billets, Pittsburgh	26.00	26.00	26.00	29.00
Open hearth billets, Philadelphia	23.40	23.40	23.40	27.50
Wire rods, Pittsburgh	27.00	27.00	27.00	28.00
OLD MATERIAL, Per Gross Ton:				
Iron rails, Chicago	14.00	14.00	14.00	16.00
Iron rails, Philadelphia	17.00	17.50	17.50	18.00
Car wheels, Chicago	13.00	13.00	12.50	14.00
Car wheels, Philadelphia	13.00	13.00	13.00	13.75
Heavy steel scrap, Pittsburgh	13.00	13.25	13.25	14.25
Heavy steel scrap, Chicago	11.00	11.00	10.50	12.25
Heavy steel scrap, Philadelphia	13.25	13.50	13.50	13.75
FINISHED IRON AND STEEL, Per Pound:	Cents.	Cents.	Cents.	Cents.
Bessemer rails, heavy, at mill..	1.25	1.25	1.25	1.25
Refined iron bars, Philadelphia.	1.27½	1.27½	1.27½	1.40
Common iron bars, Pittsburgh..	1.25	1.25	1.25	1.45
Common iron bars, Chicago	1.20	1.20	1.20	1.37½
Steel bars, Pittsburgh	1.20	1.20	1.20	1.40
Steel bars, tidewater, New York.	1.36	1.36	1.36	1.56
Tank plates, Pittsburgh	1.30	1.35	1.35	1.40
Tank plates, tidewater, New York	1.46	1.51	1.51	1.56
Beams, Pittsburgh	1.35	1.35	1.35	1.40
Beams, tidewater, New York...	1.51	1.51	1.51	1.56
Angles, Pittsburgh	1.35	1.35	1.35	1.40
Angles, tidewater, New York...	1.51	1.51	1.51	1.56
Skelp, grooved steel, Pittsburgh.	1.20	1.20	1.25	1.45
Skelp, sheared steel, Pittsburgh..	1.30	1.30	1.35	1.55
SHEETS, NAILS AND WIRE, Per Pound:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, Pittsburgh	1.95	2.00	2.00	2.15
Wire nails, Pittsburgh†	1.65	1.70	1.70	1.70
Cut nails, Pittsburgh†	1.60	1.60	1.60	1.65
Barb wire, galv., Pittsburgh†	2.00	2.00	2.00	2.00
METALS, Per Pound:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York	12.75	12.75	12.75	12.87½
Electrolytic copper, New York.	12.50	12.50	12.60	12.62½
Spelter, St. Louis	5.90	5.95	5.60	5.20
Spelter, New York	6.05	6.10	5.80	5.35
Lead, St. Louis	4.42½	4.42½	4.45	4.30
Lead, New York	4.50	4.50	4.50	4.40
Tin, New York	42.87½	45.00	42.00	35.70
Antimony, Hallett, New York..	7.75	7.75	8.00	7.87½
Tin plate, 100-lb. box, New York	$3.94	$3.94	$3.94	$3.84

* The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.
† These prices are for largest lots to jobbers.

Prices of Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Paul, 32c.; St. Louis, 22½c.; New Orleans, 30c.; Birmingham, Ala., 45c. Rates to the Pacific coast are 80c. on plates, structural shapes and sheets, No. 11 and heavier; 85c. on sheets, Nos. 12 to 16; 95c. on sheets, No. 16 and lighter; 65c. on wrought boiler tubes.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.30c. to 1.35c., base. Following are stipulations prescribed by manufacturers, with extras to be added to base price (per pound) of plates:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼ in. thick and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square foot, are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼ in. thick on edge, or not less than 11 lb. per square foot, to take base price. Plates over 72 in. wide ordered less than 11 lb. per square foot down to the weight of 3-16-in. take the price of 3-16-in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

	Cents per lb.
Gauges under ¼ in. to and including 3-16 in. on thinnest edge, extra	.10
Gauges under 3-16 in. to and including No. 8	.15
Gauges under No. 8 to and including No. 9	.25
Gauges under No. 9 to and including No. 10	.30
Gauges under No. 10 to and including No. 12	.40
Sketches (including all straight taper plates) 3 ft. and over in length	.10
Complete circles, 3 ft. in diameter and over	.20
Boiler and flange steel	.10
"A. B. M. A." and ordinary firebox steel	.20
Still bottom steel	.30
Marine steel	.40
Locomotive firebox steel	.50
Widths over 100 in. up to 110 in., inclusive	.05
Widths over 100 in. up to 115 in., inclusive	.10
Widths over 115 in. up to 120 in., inclusive	.15
Widths over 120 in. up to 125 in., inclusive	.25
Widths over 125 in. up to 130 in., inclusive	.50
Widths over 130 in.	1.00
Cutting to lengths or diameters under 3 ft. to 2 ft., inclusive	.25
Cutting to lengths or diameters under 2 ft. to 1 ft., inclusive	.50
Cuttings to lengths or diameters under 1 ft.	1.55

No charge for cutting rectangular plates to lengths 3 ft. and over.
TERMS—Net cash 30 days.

Structural Material.—I-beams and channels, 3 to 15 in., inclusive, 1.35c. to 1.40c., net. Other shapes and sizes are quoted as follows:

	Cents per lb.
I-beams over 15 in.	1.45 to 1.50
H-beams over 18 in.	1.50 to 1.55
Angles, 3 to 6 in., inclusive, ¼ in. and up	1.35 to 1.40
Angles over 6 in.	1.45 to 1.50
Angles, 3 in. on one or both legs, less than ¼ in. thick, plus full extras as per steel bar card Sept. 1, 1909	1.40 to 1.45
Tees, 3 in. and up	1.40 to 1.45
Zees, 3 in. and up	1.35 to 1.40
Angles, channels and tees, under 3 in., plus full extras as per steel bar card Sept. 1, 1909	1.40 to 1.45
Deck beams and bulb angles	1.65 to 1.70
Hand rail tees	2.45
Checkered and corrugated plates	2.45

Sheets.—Makers' prices for mill shipments on sheets of U. S. standard gauge, in carload and larger lots, on which jobbers charge the usual discounts for small lots from store, are as follows:

Blue Annealed Sheets.

	Cents per lb.
Nos. 3 to 8	1.35 to 1.40
Nos. 9 and 10	1.45 to 1.50
Nos. 11 and 12	1.50 to 1.55
Nos. 13 and 14	1.55 to 1.60
Nos. 15 and 16	1.65 to 1.70

One Pass, Cold Rolled, Box Annealed Sheets.

Nos. 10 to 12	1.60 to 1.65
Nos. 13 and 14	1.65 to 1.70
Nos. 15 and 16	1.70 to 1.75
Nos. 17 to 21	1.75 to 1.80
Nos. 22, 23 and 24	1.80 to 1.85
Nos. 25 and 26	1.85 to 1.90
No. 27	1.90 to 1.95
No. 28	1.95 to 2.00
No. 29	2.00 to 2.05
No. 30	2.10 to 2.15

Three Pass, Cold Rolled, Box Annealed Sheets.

Nos. 15 and 16	1.80 to 1.85
Nos. 17 to 21	1.85 to 1.90
Nos. 22 to 24	1.90 to 1.95
Nos. 25 and 26	1.95 to 2.00
No. 27	2.00 to 2.05
No. 28	2.05 to 2.10
No. 29	2.10 to 2.15
No. 30	2.20 to 2.25

Galvanized Sheets, of Black Sheet Gauge.

Nos. 10 and 11	1.95 to 2.00
Nos. 12, 13 and 14	2.05 to 2.10
Nos. 15, 16 and 17	2.20 to 2.25
Nos. 18 to 22	2.35 to 2.40
Nos. 23 and 24	2.45 to 2.50
Nos. 25 and 26	2.65 to 2.70
No. 27	2.80 to 2.85
No. 28	2.95 to 3.00
No. 29	3.05 to 3.10
No. 30	3.25 to 3.30

All above rates are f.o.b. Pittsburgh, terms 30 days net, or 2 per cent. cash discount 10 days from date of invoice, as also are the following base prices per square for painted and galvanized roofing sheets, with 2½-in. corrugations:

Gauge.	Painted.	Galvanized.	Gauge.	Painted.	Galvanized.
29	....	$2.40	23	$2.40	$3.50
28	$1.40	2.55	22	2.60	3.70
27	1.55	2.60	21	2.80	4.05
26	1.65	2.65	20	3.05	4.35
25	1.85	3.05	18	4.05	5.70
24	2.10	3.15	16	4.90	6.50

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Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on wrought pipe, in effect from October 1, 1910:

	Steel Black.	Steel Galv.	Iron Black.	Iron Galv.
Butt Weld.				
1 to 1½ in.	..	..	49	43
¼ in.	75	63	71	59
¾ to 1½ in.	79	69	75	65
2 to 3 in.	80	70	76	66
Lap Weld.				
2 in.	76	66	72	62
2½ to 4 in.	78	67	74	64
4½ to 6 in.	77	67	73	63
7 to 12 in.	75	59	71	55
13 to 15 in.	51½	..	..	..
Butt Weld, extra strong, plain ends, card weight.				
⅛, ¼, ⅜ in.	69	59	65	55
½ in.	74	68	70	64
¾ to 1½ in.	78	72	74	68
2 to 3 in.	79	73	75	69
Lap Weld, extra strong, plain ends, card weight.				
2 in.	75	69	71	65
2½ to 4 in.	77	71	73	67
4½ to 6 in.	76	70	72	66
7 to 8 in.	69	59	65	55
9 to 12 in.	64	54	60	50
Butt Weld, double extra strong, plain ends, card weight				
½ in.	64	58	60	54
¾ to 1½ in.	67	61	63	57
2 to 3 in.	69	63	65	59
Lap Weld, double extra strong, plain ends, card weight.				
2 in.	65	59	61	55
2¼ to 4 in.	67	61	63	57
4½ to 6 in.	66	60	62	56
7 to 8 in.	59	49	62	56
Plugged and Reamed.				
1 to 1½, 2 to 3 in. Butt Weld; 2, 2½ to 4 in. Lap Weld	will be sold at two (2) points lower basing (higher price) than merchants' or card weight pipe. Butt or lap weld, as specified.			

The above discounts are for "card weight," subject to the usual variation of 5 per cent. Prices for less than carloads are three (3) points lower basing (higher price) than the above discounts.

Boiler Tubes.—Discounts on lap welded steel boiler tubes to jobbers in carloads are as follows:

	Steel.
1¼ to 2¼ in.	65
2½ in.	67½
2¾ to 3¼ in.	70
3½ to 4½ in.	72½
5 to 6 in.	65
7 to 13 in.	62½

Less than carloads to destination east of the Mississippi River will be sold at delivered discounts for carload lowered by two points for lengths 22 ft. and under; longer lengths f.o.b. Pittsburgh. Usual extras to jobbers and boiler manufacturers.

Wire Rods and Wire.—Bessemer, open hearth and chain rods, $27. Fence wire, Nos. 0 to 9 per 100 lb., terms 60 days, or 2 per cent. discount in 10 days, carload lots, to jobbers, annealed, $1.50; galvanized, $1.80. Carload lots, to retailers, annealed, $1.55; galvanized, $1.85. Galvanized bar wire, to jobbers, $2; painted, $1.70. Wire nails, to jobbers, $1.70.

The following table gives the price to retail merchants on wire in less than carloads, including the extras on Nos. 10 to 16, which are added to the base price:

Fence Wire, Per 100 lb.

No.	0 to 9	10	11	12 & 12½	13	14	15	16
Annealed	$1.65	$1.70	$1.75	$1.80	$1.90	$2.00	$2.10	$2.20
Galvanized	1.95	2.00	2.05	2.10	2.20	2.30	2.70	2.80

Market and Stone Wire in Bundles, Discount from Standing List.

Bright and Annealed:	
9 and coarser	80
10 to 18	80 and 10
19 to 26	80 and 10 and 2½
27 to 36	80 and 5
Galvanized:	
9 and coarser	75 and 10
10 to 16	75 and 10
17 to 26	72½ and 10
27 to 36	72½
Coppered or Liquor Finished:	
9 and coarser	75 and 10
10 to 26	75 and 10
27 to 36	70 and 10 and 5
Tinned:	
6 to 18	75 and 10 and 10

Pittsburgh

PITTSBURGH, PA., August 30, 1911.—*(By Telephone.)*

Pig Iron.—The recent purchase of Northern foundry and forge iron by the Standard Sanitary Mfg. Company for the remainder of this year was 11,000 tons, instead of 7000 as stated in this report last week. The local market on Bessemer and basic iron is very dull, but there is a fair amount of new inquiry for foundry iron for delivery over the remainder of the year. A local interest representing Valley furnaces reports sales this month of upward of 20,000 tons of Northern foundry iron for delivery over the remainder of the year on the basis of $13.50, Valley furnace, for No. 2. The Bessemer Pig Iron Association reports two sales of 500 tons each of its standard Bessemer iron for September delivery at $15, Valley furnace. We quote as follows: Bessemer, $15; basic, $13 for early delivery and $13.25 for extended delivery; No. 2 foundry, $13.50 to $13.75; malleable, $13.25 to $13.50; gray forge, $13, all at Valley furnace, the freight rate to Pittsburgh being 90c.

Steel.—New inquiry is dull, nearly all consumers' billet and sheet and tin bar requirements being covered by sliding scale contracts. Mills report that specifications against contracts are coming in at a fairly satisfactory rate. The billet and rail sales department of the Carnegie Steel Company reports that its actual orders sent through the mills for rolling this month will exceed July by about 50,000 tons, a part of this business being for export. Prices on billets and bars are reported firm. We note a sale of 300 tons of forging billets for September shipment at $26, delivered, Pittsburgh district. We quote Bessemer and open hearth billets, 4 x 4 in. and up to but not including 10 x 10 in., $21, base, and sheet and tin bars in 30-ft. lengths, $22; 1½-in. billets, $22; forging billets, $26, base, usual extras for sizes and carbons, all prices being f.o.b. Pittsburgh or Youngstown district, with freight to destination added.

(By Mail.)

The present activity in the structural steel branch is the most prominent feature in the iron trade. Bids have gone in on a very large amount of work, while a good deal has been placed in the past week. This is in strong contrast with the rather quiet condition existing in nearly all other lines. In fact general developments in the steel trade have recently been of a discouraging nature. The wire trade is disturbed by reason of a letter recently sent out by one of the leading makers offering wire nails for immediate specification at $1.65 per keg at mill. This price had been quietly made for some time, but the fact that such a letter has gone to the general wire trade has upset conditions considerably. The feeling regarding the last three or four months of the year is not so cheerful as it was two or three weeks ago, and the belief is gaining ground that the expected improvement may not develop to the extent anticipated. The consuming trade is still pursuing the policy of placing orders only for such quantities of material as are actually needed to meet current wants, and there is no desire whatever to buy ahead. Prices on the whole are weak and concessions are more easily obtainable than was the case a month ago. The mills seem to be going after new business more aggressively. The pig iron market has been very quiet, but two small sales of Bessemer were reported at the full price of $15 at Valley furnace. Specifications against contracts for billets and sheet bars are fairly heavy, but new inquiries are light. It is claimed that regular prices are being obtained on such steel except in cases where consumers have special contracts on a sliding scale basis. The scrap iron trade is stagnant. While prices on furnace coke for prompt shipment are a little stronger, the new demand is very quiet.

Ferromanganese.—A sale of 1200 tons of ferromanganese to a consumer outside of the Pittsburgh district, deliveries 200 tons a month over the first half of next year, is reported. Efforts to obtain better than $37, Baltimore, for first half delivery have not succeeded. We quote foreign 80 per cent. at $36.50 for the remainder of the year and about $37 for first half of 1912, the freight rate to Pittsburgh district being $1.95 a ton.

Ferrosilicon.—Two or three fairly large inquiries for 50 per cent. are in the market for delivery over the first half of 1912, but the higher prices asked by sellers have so far prevented the business from being placed. We continue to quote 50 per cent. ferrosilicon at $53 to $54 and blast furnace silicon as follows: 10 per cent., $23; 11 per cent., $24; 12 per cent., $25, f.o.b. cars Ashland and Jisco furnaces.

Muck Bar.—In the absence of actual sales we continue to quote best grades, made from all pig iron, at $28.50 to $29, Pittsburgh.

Skelp.—A fair amount of inquiry is being received and a sale is reported of about 1500 tons of sheared iron plates for September and October delivery on the basis of about 1.65c., Pittsburgh. We quote: Grooved steel skelp, 1.20c.; sheared steel skelp, 1.30c.; grooved iron skelp, 1.45c. to 1.55c., and sheared iron skelp, 1.65c. to 1.70c., all for delivery at consumers' mills in the Pittsburgh district.

Wire Rods.—New inquiry for wire rods is very light, most consumers being covered by contracts, against which specifications are not coming in very freely. We continue to quote Bessemer, open hearth

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and chain rods at $27, Pittsburgh, but this price might be shaded on a desirable order.

Steel Rails.—Several fairly large inquiries for standard sections are in the market and will probably be closed this week. The Carnegie Steel Company received new orders and specifications in the past week for a little over 2500 tons of light rails. Prices on light rails are as follows: 12-lb., 1.25c.; 16, 20 and 25-lb., 1.21c. to 1.25c.; 30 and 35-lb., 1.20c., and 40 and 45-lb., 1.16c. These prices are f.o.b. at mill, plus freight, and are the minimum of the market in carload lots, small lots being sold at a little higher price. Standard sections are held at 1.25c. per lb. for Bessemer.

Plates.—New car orders have been rather slow in coming out in the past week or 10 days. The Pressed Steel Car Company has taken a contract for 100 steel hopper cars for the Buffalo Creek & Gauley Railroad, 100 steel gondolas for the Havana Central Railroad of Cuba, 691 composite gondola cars and 26 composite flat cars for the Pennsylvania Lines West and to steel ore cars for the Northwestern Iron Company. The largest inquiry in the market at present is that of the Missouri Pacific Railroad for 2000 steel gondola cars, 1000 steel underframe ore cars and 1000 mixed cars. Prices on plates continue rather weak and 1.30c. is being named on desirable orders. We quote ¼-in. and heavier plates at 1.30c. to 1.35c., f.o.b. Pittsburgh.

Structural Material.—Inquiries are heavy and some work has been placed. The Jones & Laughlin Steel Company has taken 150 tons for a new foundry building for Munson Brothers at Syracuse, N. Y., and 150 tons for a brewery in Santiago. Bids have gone in on 2600 to 3000 tons of steel for an addition to the First National Bank Building, in this city, of 20 stories. The Youngstown Sheet & Tube Company will soon place contracts for 6000 to 7000 tons of steel for new buildings to house its open hearth plant and other departments. We continue to quote beams and channels up to 15 in. at 1.35c., Pittsburgh.

Merchant Steel.—New orders are fairly active, but mostly for small lots to cover current needs, while specifications against contracts are coming in at only a moderate rate. Regular prices, which are more or less shaded, are as follows: Iron finished tire, ¼ x ½ in., and heavier, 1.40c., base; under these sizes, 1.55c.; planished tire, 1.60c.; channel tire, 1.80c., base; toe calk, 1.90c.; flat sleigh shoe, 1.55c.; concave or convex, 1.75c.; cutter shoes, tapered or bent, 2.25c.; spring steel, 2c.; machinery steel, smooth finish, 1.90c.

Hoops and Bands.—Specifications against contracts are better, new orders are coming in at a fairly heavy rate and shipments by the mills this month will show an increase over July. We quote steel hoops at 1.40c. and bands at 1.25c., with extras on the latter as per the steel bar card.

Sheets.—The new demand for sheets continues quite heavy from all sections of the country, and specifications are coming in rather freely, but there still continues to be some shading in prices, notably in the Western and Southwestern territories. In most cases the cutting is about $1 per ton, but when a nice specification comes up, either in black, galvanized or roofing sheets, some mills shade regular prices $2 per ton. However, makers state that prices on galvanized sheets are a little stronger, due to the recent heavy advance in spelter. The outlook is that shipments of sheets by the mills in August will be heavier than last month. The prices now in effect on black, galvanized and roofing sheets are printed on a previous page.

Tin Plate.—Specifications from can makers will likely slow up soon, but reports are that specifications for bright plate from the salmon packers are expected for the next six weeks or longer. Shipments by the mills this month have been heavy and will exceed those in July. The American Sheet & Tin Plate Company reports that its tin plate business this year will be the largest in its history, and several of the leading independent mills also report that their shipments this year are likely to exceed those of previous years. In regard to prices it can be stated that if any large new business in tin plate was being offered it could probably be placed at $3.60 per base box, but all the leading makers, including the American Sheet & Tin Plate Company, have large contracts for tin plate on their books on the $3.70 per box basis, and against which consumers are specifying freely. The mills are operating close to 80 per cent. of capacity and expect to maintain this rate of operation for the next month or six weeks. We quote 100-lb. cokes at $3.70 per base box, f.o.b. Pittsburgh.

Bars.—A fair amount of business is being placed, but most consumers, large and small, have pretty well covered their requirements for some time ahead and are specifying quite freely against these contracts. There is still some weakness in prices of steel bars, and on desirable orders 1.20c. at mill is still being named in some cases, but several large makers report they are pretty well filled up and are holding at 1.25c. The market on iron bars is quiet, new demand being dull and only for small lots, with the mills not operating to more than 50 to 60 per cent. of capacity. We quote steel bars at 1.20c. to 1.25c. and iron bars 1.25c. to 1.30c., Pittsburgh.

Rivets.—The new business being placed is mostly in small lots to cover actual needs, but specifications against contracts have been coming in a little better this month than in July. We quote structural rivets at 1.70c. to 1.75c., and boiler rivets at 1.80c. to 1.85c., but in very exceptional cases and for desirable business these prices are slightly shaded.

Wire Products.—A few days ago one of the leading wire nail mills sent out a letter to the trade offering to accept orders for wire nails for immediate specification at $1.65, base, and this has disturbed the whole situation in the wire trade. The demand for wire and wire nails is quiet, and only for small lots to cover actual needs. Regular prices are as follows: Galvanized barb wire, $2 per 100 lb.; painted, $1.70; annealed fence wire, $1.50; galvanized, $1.80; wire nails, $1.70, and cut nails, $1.60, all f.o.b. Pittsburgh, with full weight added to point of delivery.

Spelter.—The market is quiet and prices have gone off in the past week. We quote prime grades of Western at 5.80c., East St. Louis, equal to 5.92½c., Pittsburgh, for prompt shipment. Futures are quoted at lower figures.

Railroad Spikes.—In the past week or two the Baltimore & Ohio Railroad has placed orders for 2000 kegs with a local maker and the Louisville & Nashville is reported to have placed about 6000 kegs, but none of this business came to local mills. We quote railroad spikes at $1.50 per 100 lb., base sizes, f.o.b. Pittsburgh.

Shafting.—The new demand is only for small lots to cover actual needs, while specifications from automobile builders and other large consumers are not coming in at a satisfactory rate. In fact, the general condition of the shafting trade, both as regards new demand and prices, is not good, and has not been for some time.

Merchant Pipe.—Last week the National Tube Company took an order from the Medina Gas & Fuel Company, Lima, Ohio, for 68 miles of 10-in. pipe for a gas line, to be used in conveying natural gas from the Lima gas fields to Mansfield, Ohio. Mills report that the current demand for iron and steel merchant pipe is fairly heavy, being larger so far this month than in July, with the outlook for fall trade very good. Leading mills continue to run to about 70 per cent. of capacity, or slightly more. Regular discounts on both iron and steel pipe are being shaded to more or less extent.

Boiler Tubes.—The new demand for railroad tubes is fairly active, but on merchant tubes is still very dull, as it has been for some months. Regular discounts are being more or less shaded, and the general condition of the boiler tube trade is very unsatisfactory to the mills.

Coke.—A local producer of Connellsville coke reports a sale of about 10,000 to 12,000 tons for September shipment at $1.50 per net ton at oven. Two Valley blast furnace operators have inquiries out for 40,000 to 50,000 tons of coke for shipment over the next several months, and this will likely be closed within the next few days. The output of coke is increasing and is slightly higher now than for some time. The Upper and Lower Connellsville regions in the past week turned out 313,722 tons, an increase over the previous week of 9700 tons. We quote standard makes of furnace coke for prompt shipment at $1.50, and for remainder of the year at $1.60 to $1.65 in net tons at oven. We quote standard 72-hr. foundry coke for prompt shipment at $1.85 to $1.90, and for future delivery at $2.10 up to $2.25 per net ton, at oven.

Iron and Steel Scrap.—The scrap market is practically stagnant, very little material moving from dealers to consumers. Prices on all grades are decidedly weak, particularly on borings and turnings. We note a sale of 1000 tons of cast iron borings at about $9.50 delivered to buyer's mill, and 1000 tons of machine

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shop turnings at about $9.75, delivered in Pittsburgh district. Dealers now quote as follows, per gross ton, f.o.b. Pittsburgh, unless otherwise noted:

Heavy steel scrap, Steubenville, Follansbee, Sharon, Monessen and Pittsburgh delivery	$13.00 to $13.25
No. 1 foundry cast	13.25 to 13.50
No. 2 foundry cast	12.75 to 13.00
Bundled sheet scrap, f.o.b. consumers' mill, Pittsburgh district	11.75 to 12.00
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	13.50 to 13.75
No. 1 railroad malleable stock	12.75 to 13.00
Grate bars	10.75 to 11.00
Low phosphorus melting stock	15.75 to 16.00
Iron car axles	23.00 to 23.50
Steel car axles	17.50 to 18.00
Locomotive axles	23.00
No. 1 busheling scrap	12.00 to 12.25
No. 2 busheling scrap	8.50 to 8.75
Old car wheels	13.00 to 13.25
Sheet bar crop ends	15.25 to 15.50
*Cast iron borings	9.50
*Machine shop turnings	9.75
Old iron rails	15.50 to 15.75
No. 1 wrought scrap	13.50 to 14.00
Heavy steel axle turnings	10.00 to 10.25
Stove plate	10.50 to 10.75

*These prices are f.o.b. cars at consumers' mills in the Pittsburgh district.

Chicago

CHICAGO, ILL., August 29, 1911.

The tonnage of fabricated steel awarded under contract during the past week stands out among market considerations very prominently. A total of nearly 35,000 tons, of which over 31,000 tons was taken by the American Bridge Company, was placed. These lettings do not include any of the steel that will be required for the several new office buildings to be erected in the loop district of Chicago, for which permits were issued during the week. With the office building construction now in progress, the new buildings contemplated, having a valuation aggregating over $18,000,000, will give to Chicago an unprecedented period and tonnage of steel construction. There is less occasion for optimism in connection with railroad buying. The generally accepted reports of retrenchment by railroad systems, both east and west of the Mississippi, have had concrete support the past ten days in a marked decrease in specifications received. The leading steel bar interests are apparently well satisfied with the situation and with their mill bookings as far ahead as January 1, but among those mills dependent upon current business the shading of prices to secure orders continues without abatement. Plate and sheet tonnage is being booked in about the same volume as in the past three or four weeks, but it is not expected that August will show up as well as July. Pig iron buying is very moderate, with Birmingham prices firmly maintained, and local iron prices unchanged for lack of sufficient business to excite keener competition. The scrap iron market shows some tendency toward weakness in keeping with the limited demand from melters and the constant inflow of railroad offerings.

Rails and Track Supplies.—Rail business for the past week was reported as disappointingly light. A lot of 500 tons of open-hearth rails was placed and also one of 2500 tons of Bessemer. Several of the railroads have inquiries out covering equipment, but the placing of this business is delayed from day to day, and one inquiry for 2000 cars has been withdrawn. The demand for spikes and bolts is less active, and prices are inclined to be less firm. It is possible to obtain track spikes freely at our minimum quotation. We quote standard railroad spikes at 1.65c. to 1.75c., base; track bolts with square nuts, 2.10c. to 2.20c., base, all in carload lots, Chicago; standard section Bessemer rails, 1.28c.; open hearth, 1.34c.; light rails, 40 to 45 lb., 1.16c. to 1.20½c.; 30 to 35 lb., 1.19½c. to 1.24c.; 16, 20 and 25 lb., 1.20½c. to 1.25c.; 12 lb., 1.25c. to 1.30½c.; angle bars, 1.50c. to 1.60c., Chicago.

Pig Iron.—While displaying an active interest in the market, as evidenced by an undiminished volume of inquiry, pig iron melters are slow to place orders. Such business as is closed evidently follows only upon the closing of contracts for castings. There is practically no buying to provide for possible requirements, and apparently all those in a position to do so took in as much as possible of the low-priced iron of a month ago. Buying, therefore, has been moderate and in small lots. The price of standard Birmingham iron continues firmly at $10.50 for deliveries through the balance of the year, with $11 asked for two or three of the high-grade brands. It is understood that some high phosphorus iron may still be obtained on the basis of $10, Birmingham. These prices with freight added for delivery in Chicago permit local iron to be sold slightly under the Southern price, but for delivery to Fox River and Mississippi River points they give to Southern iron a slight advantage over the output of Chicago furnaces. The distribution of sales has followed very largely these price advantages. We quote for Chicago delivery, except for local irons, which are f.o.b. furnace, the following prices:

Lake Superior charcoal	$16.50 to $17.00
Northern coke foundry, No. 1	15.00 to 15.50
Northern coke foundry, No. 2	14.50 to 15.00
Northern coke foundry, No. 3	14.25 to 14.50
Northern Scotch, No. 1	16.00
Southern coke, No. 1 foundry and No. 1 soft	15.10
Southern coke, No. 2 foundry and No. 2 soft	14.60
Southern coke, No. 3	14.35
Southern coke No. 4	14.10
Southern gray forge	13.85
Southern mottled	13.85
Malleable Bessemer	14.50 to 15.00
Standard Bessemer	17.40
Basic	15.50
Jackson Co. and Kentucky Silvery, 6 per cent.	17.90
Jackson Co. and Kentucky Silvery, 8 per cent.	18.90
Jackson Co. and Kentucky Silvery, 10 per cent.	19.90

Structural Material.—The market situation as to structural steel offers greater occasion for optimism than any other current phase. During the past ten days contracts for fabricated work aggregating nearly 35,000 tons were awarded, of which the American Bridge Company secured over 31,000 tons. Of this business, the 5300 tons for the Northwestern Mutual Life Building at Milwaukee was previously reported. In addition to the tonnage above mentioned the American Bridge Company will fabricate 2220 tons for the Kansas City Terminal Railway Company street crossings, 7230 tons for the municipal bridge at St. Louis, 14,154 tons for the Kansas City Terminal Station, 2000 tons for the Los Angeles Investment Company Building, and 441 tons for a high school building at Seattle, Wash. Other contracts include 310 tons for the Chicago Great Western Railway at Oelwein, Iowa, to the Vierling Steel Works, 3000 tons of deck girder spans for the Missouri Pacific Railroad, to the Virginia Bridge & Iron Company, and 404 tons for the International Trust Company Building at Denver, Col., to the Jackson-Richter Iron Works. The ordinance limiting the height of buildings in the Chicago loop district, which goes into effect the coming week, has been the occasion for the hurried beginning of a number of buildings, the aggregate cost of which will be over $18,000,000. These include the Continental and Commercial National Bank, Marshall Field & Co. office building, a second Marshall Field estate building, Henry C. Lytton store and office building, Chicago, Burlington & Quincy Railroad office building, Boston Store addition, Kesner building, and Morrison Hotel. This new construction, added to the seven similar buildings now in process of erection, constitutes the most remarkable building record Chicago has experienced. Local fabricating shops have work for little more than 60 days in advance, but most of the structural mills are filled practically to capacity for several months to come. Prices of plain material are said to be well maintained. We quote plain material, mill shipment, for Chicago delivery, at 1.53c., and from store, 1.75c.

Plates.—Local mills report that plate tonnage booked continued at about the same rate as during the entire month of August. Indications based upon the activity of plate fabricators point to a consumption somewhat below the average. In competition with Eastern plate mills local interests report a tendency to shade prices. We continue to quote for Chicago delivery, from mill, 1.53c., and from store 1.65c.

Sheets.—No improvement is apparent in the matter of prices prevailing for sheets. Notwithstanding the low prices obtainable buyers continue to avoid buying beyond actual needs. Inasmuch as present quotations are the lowest offered in years the lack of confidence can hardly be attributed to an expectation of still lower prices, but must rather arise from uncertainty as to the continuity of satisfactory business conditions. While calling attention to the more or less freely offered concessions of $1 to $1.50 per ton, we continue to quote, nominally, the following prices for Chicago delivery: Carload lots, from mill: No. 28 black sheets, 2.18c.; No. 28 galvanized, 3.18c.; No. 10 blue annealed, 1.68c. Prices from store, Chicago, are: No. 10, 1.85c. to 2.05c.; No. 12,

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2c. to 2.10c.; No. 28 black, 2.45c. to 2.55c.; No. 28 galvanized, 3.45c.

Bars.—Bar iron manufacturers in this territory claim to be taking no contract business at lower prices than $1.25c., Chicago. The only exceptions to this are such slight concessions as are made on immediate shipment orders. The price situation as regards steel bars is decidedly in contrast and quotations as low as 1.33c., Chicago, are reported. Steel bar tonnage is moderately active. We quote as follows, f.o.b. Chicago: Soft steel bars, 1.43c.; bar iron, 1.20c. to 1.25c.; hard steel bars, rolled from old rails, 1.20c. From store, soft steel bars, 1.70c. to 1.80c., Chicago.

Wire Products.—The approach of what promises to be an early fall season is accompanied by a very apparent improvement in wire nails and the fence wire trade. The reawakening of activity in these products has lessened the stress as to prices, and shading is correspondingly less common. Jobbers' carload prices, which are quoted to manufacturing buyers, are as follows: Plain wire, No. 9 and coarser, base, 1.68c.; wire nails, 1.88c.; painted barb wire, 1.88c.; galvanized, 2.18c.; polished staples, 1.88c.; galvanized, 2.18c., all Chicago.

Cast Iron Pipe.—The lettings of the past week included 700 tons of culvert pipe for the Great Northern Railway and 4000 tons for Coronado, Cal., to the United States Cast Iron Pipe & Foundry Company; at St. Louis 700 tons was awarded to the Lynchburg Foundry Company and 1100 tons awarded at Los Angeles was distributed among the Lynchburg Foundry Company, American Cast Iron Pipe Company and United States Cast Iron Pipe & Foundry Company. We quote as follows, per net ton, Chicago: Water pipe, 4-in., $25.50; 6 to 12-in., $24.50; 16-in. and up, $24, with $1 extra for gas pipe.

Old Material.—The local scrap market has been called upon to absorb a large tonnage of material offered on recent list by the railroads, and on the other hand melters show little eagerness in taking their average requirements. Some melters are in the market only at prices considerably below market quotations. The Chicago, Rock Island & Pacific sells 4000 tons of scrap this week, and the Chicago, Burlington & Quincy Railroad has a list of 2000 tons. The Baltimore & Ohio Railroad has in the neighborhood of 1500 tons for sale at East Chicago. We continue to quote for delivery to buyers' works, Chicago and vicinity, all freight and transfer charges paid, per gross ton, as follows:

Old iron rails	$14.00 to $14.50
Old steel rails, rerolling	12.75 to 13.25
Old steel rails, less than 3 ft.	11.50 to 12.00
Relaying rails, standard sections, subject to inspection	24.00
Old car wheels	13.00 to 13.50
Heavy melting steel scrap	11.00 to 11.50
Frogs, switches and guards, cut apart	10.75 to 11.25
Shoveling steel	10.50 to 11.00
Steel axle turnings	8.50 to 9.00

The following quotations are per net ton:

Iron angles and splice bars	$12.50 to $13.00
Iron arch bars and transoms	13.75 to 14.25
Steel angle bars	10.25 to 10.75
Iron car axles	18.00 to 18.50
Steel car axles	16.00 to 16.50
No. 1 railroad wrought	11.00 to 11.50
No. 2 railroad wrought	10.00 to 10.50
Steel knuckles and couplers	10.00 to 10.50
Locomotive tires, smooth	15.00 to 15.50
Machine shop turnings	6.25 to 6.75
Cast and mixed borings	6.00 to 6.50
No. 1 busheling	8.75 to 9.25
No. 2 busheling	6.75 to 7.25
No. 1 boilers, cut to sheets and rings	7.50 to 8.00
Boiler punchings	12.00 to 12.50
No. 1 cast scrap	10.50 to 11.00
Stove plate and light cast scrap	9.00 to 9.50
Railroad malleable	10.25 to 10.75
Agricultural malleable	9.25 to 9.75
Pipes and flues	8.00 to 8.50

The Oakdale Iron Company has been incorporated to do a general business in iron and steel scrap and relaying rails, and has established a yard at Oakdale, Ninety-first street and the Western Indiana Belt Railroad, Chicago. The offices of the company will be located at 1119 McCormick Building. Louis Benjamin is president and Theo. A. Schwengel is secretary and treasurer. Both were formerly connected with the Block-Pollak Iron Company, Mr. Benjamin as vice-president.

Philadelphia

PHILADELPHIA, PA., August 29, 1911.

The business of the past week has been of the quiet, routine, hand-to-mouth buying, which covered only immediate requirements for prompt delivery, there being no inclination on the part of sellers to stimulate inquiry beyond requirements for immediate needs. All business placed has been on small orders, but the aggregate of these gives a very fair volume of business. Prices have remained stationary, excepting a tendency to shade steel bars for immediate shipment, where a concession of $1 a ton has been made, and in the old material market a recession of from 25c. to 50c. is noted all along the line. The chief item in prospective business developing in the past week has been four new steel ships, for which bids will be asked within a short time. It is estimated that the plates for these ships will amount to 30,000 tons and the shapes between 10,000 and 12,000 tons. This is taken as an indication of the stimulation that will come to shipbuilding because of the Isthmian Canal.

Iron Ore.—Interest is centered in a transaction involving heavy tonnage, which will not be closed for a month or six weeks. Arrivals of foreign ore reported in the past week include 12,600 tons from Newfoundland and 10,775 tons from Cuba.

Pig Iron.—The only transaction of note has been the purchase by local interests of approximately 5000 tons of Bessemer iron, about half of which was supplied by a furnace not usually making this grade. Deliveries extend through the remainder of the year. Basic iron has not been in demand, but there has been a fair movement in foundry iron, the total for Northern grades being estimated at about 1200 tons in lots running from 50 tons to 100 tons. Prices are firm, with a tendency to stiffen for future deliveries. There have been one or two inquiries running into next year, but furnaces are discouraging such inquiries and are not prepared to quote beyond last quarter. The feature of the week in foundry iron has been the pressure for deliveries on immediate shipment iron, which is the result of low stocks in consumers' yards. Some Virginia furnaces are asking $12.50 for last quarter foundry iron, but most of them are selling at $12.25 for last half. A Birmingham interest has refused to take on 1000 tons of foundry iron at $10.10, Birmingham, but has accepted about 1500 tons in the past week, in about 100-ton lots, on the basis of $10.25, Birmingham. It is also reported that another company made a sale at Baltimore on the basis of $10. Two or three small lots of low phosphorus Northern iron were sold, the price being between $20 and $20.50, delivered, for standard analysis iron. The following range of quotations is named for standard brands, delivered in buyers' yards in this vicinity, shipment ranging from prompt to the remainder of the year:

Eastern Pennsylvania No. 2 X foundry	$15.00 to $15.25
Eastern Pennsylvania No. 2 plain	14.75 to 15.00
Virginia foundry	15.00 to 15.50
Gray forge	14.25 to 14.50
Basic	14.75 to 15.00
Standard low phosphorus	20.00 to 20.50

Ferroalloys.—In the past 10 days a round tonnage of 80 per cent. ferromanganese has been sold on the basis of $36.50, Baltimore. This is stated to be speculative material not representing the market, which is now held at $37, Baltimore. For 50 per cent. ferrosilicon the quotation is $57, with a tendency to strengthen. Furnace ferrosilicon is quoted at $23 for 10 per cent., $24 for 11 per cent., $25 for 12 per cent., f.o.b. cars at furnaces, plus a freight of $3.30 to Philadelphia points. Specifications are within Bessemer limits as to phosphorus and sulphur.

Billets.—New business has been light and confined to small sales for early delivery, and little tendency is shown by consumers to contract at this time for extended shipment. Quotations are $23.40 for open hearth rolling billets and $28.40 for ordinary forging billets, delivered in buyers' yards in this vicinity.

Plates.—Announcement that within the next week or 10 days bids would be asked for material for four steel vessels has put a little life into the plate market. It is estimated that these ships will require at least 30,000 tons of plates. They will enter the Pacific coast trade via the Panama Canal. Plate mills in this territory report business for the first three weeks of the present month to be considerably larger than for the entire month of July. Quotations are firm at 1.50c., delivered here.

Structural Material.—The low prices being quoted on fabricated steel erected, averaging between $38 and $40 a ton, have not stimulated business to the extent of bringing out any large new projects; several fair sized buildings which have been contemplated are slow in coming out. The contract for the Savannah Hotel, in which 1500 tons of steel will be used, has been let

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to a local contractor. The Elkins Y. M. C. A. Building has not progressed beyond the drawing boards. A local fabricator has taken about 1600 tons of bridge work on various railroads. Inquiries have been light as far as tonnage is concerned, but have been fair in number. Plain shapes are 1.50c., delivered in this district.

Bars.—Steel bars have been shaded in this market to 1.35c., delivered. Rumors that lower than this has been done cannot be confirmed. Quotations on iron bars are 1.20c., Eastern mill, on desirable business, and 1.22½c. on less desirable specifications. Business has been confined to small lots for immediate shipment. Reports of more extended shading in the steel bar prices have been heard, but probably were the result of a slight concession on twisted steel bars for reinforced work, which went on the regular card without charge for twisting. While, as in other lines, the total tonnage placed during the week past has been in keeping, if not slightly ahead of previous weeks, it was made up entirely of small orders, and for near-by delivery.

Sheets.—Eastern mills are holding firmly to their quotations, although the volume of new business is very light, and some of the mills are running on easy schedule. The price-cutting of Western mills has not affected the local situation, freight rates operating as an effectual barrier against invasion from the Pittsburgh and Youngstown districts.

Coke.—A better feeling pervades the coke market and there is a tendency to strengthen prices on standard brands, in line with the stronger demand and increased shipments, which are, for the most part, for spot shipment. We note the sale during the past week of 2000 tons of heating coke at $1.50, at oven. Furnace coke for prompt shipment is quoted at $1.50 to $1.60 at oven, and on contract coke for six months or a year, $1.60 to $1.70. Foundry coke, for which a few fair-sized contracts covering the remainder of the year have been placed, is quoted $2 to $2.10 for spot, and $2.20 to $2.35 on contract. The following range of quotations is named, per net ton, for deliveries in this vicinity:

Connellsville furnace coke	$3.75 to $3.95
Foundry coke	4.25 to 4.60
Mountain furnace coke	3.35 to 3.55
Foundry coke	3.85 to 4.20

Old Material.—The scrap market has undergone a decided slump the past week, and lower prices are quoted on nearly every kind of old material. Many of these quotations are nominal and do not represent actual sales, but rather the ideas of the large consumers who have bid on the material. Few sales have been made and dealers are awaiting developments, feeling that the present is essentially a buyer's market. The softening in prices is attributed to the fact that most of the steel works have large stocks on hand, ample to meet their requirements for 60 or 90 days, and have reduced their offering price to secure a lower average. There is practically no speculative buying or selling. The following range of prices about represents the market for early deliveries in buyers yards, eastern Pennsylvania and nearby points, taking a freight rate from Philadelphia, varying from 35c. to $1.35 per gross ton, for shipment, ranging from prompt to the remainder of the year:

No. 1 railroad heavy melting steel scrap	$13.25 to $13.50
No. 1 yard heavy melting steel scrap	12.75 to 13.00
Old steel rails, rerolling (nominal)	14.00 to 14.50
Low phosphorus heavy melting steel scrap	16.75 to 17.25
Old steel axles (nominal)	19.50 to 20.00
Old iron axles (nominal)	24.50 to 25.00
Old iron rails	17.00 to 17.50
Old car wheels (nominal)	13.00 to 13.50
No. 1 railroad wrought	15.50 to 16.00
Wrought iron pipe	12.75 to 13.00
No. 1 forge fire	11.00 to 11.50
No. 2 light iron (nominal)	6.75 to 7.25
Wrought turnings	8.75 to 9.25
Cast borings	8.25 to 8.75
Machinery cast	13.00 to 13.50
Railroad malleable (nominal)	11.50 to 12.00
Grate bars, railroad	10.00 to 10.50
Stove plate	10.00 to 10.50

St. Louis

ST. LOUIS, MO., August 28, 1911.

Pig Iron.—The movement in this line is very largely of the carload lot order, but the number of orders is sufficient to make a good aggregate tonnage. The furnaces have assumed so firm an attitude on prices that consumers are buying only for immediate requirements. No. 2 Southern continues firm at $10.50 to $11, Birmingham, and little if any $10 iron is now to be found here. Southern No. 4 foundry and gray forge iron are almost impossible to get and there is very little No. 3 to be found. No inquiries of consequence are out and only three sales larger than the carload lot class are reported, one of 500 tons for last quarter delivery, one of 1500 tons for the same delivery, both No. 2 Southern, and 1000 tons of high silicon. There is nothing doing here on Northern foundry, basic or malleable.

Coke.—The demand, while fair in the aggregate, is largely made up of small orders for immediate requirements and requisitions on contracts. There is practically no change in prices, though they may be said to be a little more firmly held than has been the case recently. One sale of 5000 tons of Virginia coke at the market constitute the only really sizable order for the week. Reports generally show that practically none of the melters are asking that shipments of coke be held back on their contracts.

Finished Iron and Steel.—Fabricators are actively in the market and are ordering principally for specific jobs and emphasizing the necessity for quick shipment. In this latter respect the competition is becoming keen and the outlook seems to be for further improvement in already good business. In bars the agricultural and wagon trades are active and are placing liberal specifications. Plates are quiet and very little moving. In standard rails the transactions include 1210 tons for the Oklahoma Railway Company and another order of 1000 tons for another Oklahoma system. It is also announced that the Kansas City & St. Joseph Interurban has completed its financing and is ready to make contract for rails, which will bring it into the market for 7500 to 10,000 tons within the next 30 to 60 days. Track fastenings are inactive, but prices are firm. In light rails the coal trade demand is quiet and very little tonnage is being placed. The demand from the lumber companies is practically nil. In general, in this division of trade there is little complaint as to the aggregate of business.

Old Material.—The flurry in steel scrap, which has occupied the attention of the market for several weeks, seems to have passed and there has been a softening of the situation. This is also the case with iron scrap. There has been somewhat of an increase in the requests for relaying standard section rails. None of the railroad lists is out as yet, but several are expected before the end of the week. Dealers are buying now against a renewed demand, and this is preventing quotations from sagging off to any serious extent. Further activity is looked for after the first of the coming month. Dealers' prices, per gross ton, f.o.b. St. Louis, are as follows:

Old iron rails	$13.00 to $13.50
Old rails, rerolling	13.00 to 13.50
Old steel rails, less than three feet	11.50 to 12.00
Relaying rails, standard section, subject to inspection	23.00 to 23.50
Old car wheels	13.00 to 13.50
Heavy melting steel scrap	11.50 to 12.00
Frogs, switches and guards cut apart	11.50 to 12.00

The following prices are per net ton:

Iron fish plates	$11.00 to $11.50
Iron car axles	19.50 to 20.00
Steel car axles	18.50 to 19.00
No. 1 railroad wrought	11.25 to 11.75
No. 2 railroad wrought	10.25 to 10.75
Railway springs	9.75 to 10.25
Locomotive tires, smooth	14.50 to 15.00
No. 1 dealers' forge	8.50 to 9.00
Mixed borings	6.50 to 7.00
No. 1 busheling	9.50 to 10.00
No. 1 boilers, cut to sheets and rings	8.00 to 8.50
No. 1 cast scrap	10.00 to 10.50
Stove plate and light cast scrap	8.00 to 8.50
Railroad malleable	8.50 to 9.00
Agricultural malleable	7.50 to 8.00
Pipes and flues	8.50 to 9.00
Railroad sheet and tank scrap	8.50 to 9.00
Railroad grate bars	8.00 to 8.50
Machine shop turnings	7.50 to 8.00

Cincinnati

CINCINNATI, OHIO, August 30, 1911.—*(By Telegraph.)*

Pig Iron.—The market is featureless, the inquiry is much lighter and only very small lots of iron are sold, an indication that melters in this territory are well provided for this year. No change in the situation is anticipated until the furnaces open their books for next year's requirements. While it is true that nominal quotations are out around $11, Birmingham, for the first quarter business, this figure is considered prohibitive. Southern iron continues to show more strength than that from the Ironton district, and in the face of the light demand the recent Southern price advance is understood to be observed by the majority of producers. About

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400 tons of Southern No. 2 foundry was taken by an Indiana firm at $10.25 for August-December shipment. Smaller lots for the same delivery and at the same price go to nearby melters for shipment in the last quarter. A northern Ohio consumer contracted for 100 tons of No. 1 soft at $10.75, Birmingham. A central Ohio manufacturer bought 2000 tons of Northern foundry from a nearby furnace at the prevailing market price, but it is rumored that deliveries were extended into the first part of next year. No large inquiries are out for either Northern or Southern iron, and, contrary to the usual custom at this time of the year, consumers are not even feeling around to see what can be done for next year. Northern foundry No. 2 is quoted around $13 to $13.25, with the first named price representing the figure generally inserted in last quarter contracts. Malleable remains quiet, and is quoted around $13.25, Ironton. It is reported that two furnaces in the Hanging Rock district will be blown in next week on foundry iron. Based on freight rates of $3.25 from Birmingham and $1.20 from Ironton, we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 foundry and 1 soft	$14.00 to $14.25
Southern coke, No. 2 foundry and 2 soft	13.50 to 13.75
Southern coke, No. 3 foundry	13.00 to 13.25
Southern coke, No. 4 foundry	12.75 to 13.00
Southern gray forge	12.75 to 13.00
Ohio Silvery, 8 per cent. silicon	16.95 to 17.20
Lake Superior coke, No. 1	14.70 to 14.95
Lake Superior coke, No. 2	14.20 to 14.45
Lake Superior coke, No 3	13.70 to 13.95
Basic, Northern	14.20 to 14.45
Standard Southern car wheel	25.50 to 25.75
Lake Superior car wheel	19.00

(By Mail.)

Coke.—For gas-producing purposes a few medium-sized contracts for coke have lately been closed and there has also been some buying of furnace coke. Foundry grades are moving slowly, as far as new contracts are concerned, but prices in all three districts are firmer. The curtailment in production in the Wise County field has given producers there an opportunity to get more money for their coke, and it is stated that standard brands of 48-hr. coke are not now obtainable below $1.65 per net ton at oven, for prompt shipment, with the usual premium of 10c. to 25c. per ton asked on contract business. Pocahontas furnace coke is quotable around the same figures, but Connellsville furnace grades do not show up so strong, and as low as $1.55 at oven has been done in that territory. Foundry coke is quotable around $2 to $2.35 in all three fields.

Finished Material.—There has been practically no change in the market conditions previously reported, with the exception of a slightly better demand for structural material. Warehouse prices remain steady at 1.70c. for steel bars and 1.80c. for structural material. For a carload quantity of steel bars the regular Pittsburgh quotation of 1.25c. could possibly be shaded. Railroad track material shows some improvement and there is also a better demand for sheets, with prices in this territory ruling very much firmer.

Old Material.—Buyers and sellers appear to be unable to get together, and, as a consequence, prices are not quite so firm. The railroads are understood to be offering large tonnages, with very little disposition shown by dealers to take on any additional stocks. The approximate prices paid by buyers delivered in their yards, southern Ohio and Cincinnati, are as follows:

No. 1 railroad wrought, net ton	$10.25 to $10.75
Casting borings, net ton	4.50 to 5.00
Steel turnings, net ton	5.50 to 6.00
No. 1 cast scrap, net ton	9.25 to 9.75
Burnt scrap, net ton	6.25 to 6.75
Old iron axles, net ton	16.25 to 16.75
Bundled sheet scrap, gross ton	7.25 to 8.25
Old iron rails, gross ton	13.25 to 13.75
Relaying rails, 50 lb. and up, gross ton	20.75 to 21.50
Old car wheels, gross ton	10.00 to 10.50
Heavy melting sheet scrap, gross ton	9.75 to 10.25

Cleveland

CLEVELAND, OHIO, August 29, 1911.

Iron Ore.—No sales are reported, and the only new inquiry is for only about 25,000 tons. The only thing that can stimulate any kind of a buying movement before the end of the season, in the opinion of some of the leading ore firms, is the development of considerable activity in the pig iron market during the next month. There is little expectation, however, that there will be enough improvement in the demand for pig iron to bring out orders for ore in blocks of any size. Ore shipments are being made at about the same rate as a month ago and vessel men have given up hope of any improvement this season. Shippers are having about all they can do in taking care of their own tonnage, and there are indications that the movement will begin to slow down about October 1. We quote prices as follows: Old range Bessemer, $4.50; Mesaba Bessemer, $4.25; old range non-Bessemer, $3.70; Mesaba non-Bessemer, $3.50.

Pig Iron.—The market is extremely dull. Sales have been limited to a few small lots for prompt shipment, and for the last quarter. Not many new inquiries have come out, these being mostly for lots ranging from 200 to 400 tons for delivery the remainder of the year. Consumers are taking no interest in the market for the first quarter of next year, and some seem to prefer to place orders for small lots for spot shipment, rather than contract for future delivery. Following the recent spurt in buying Southern iron, there is practically no inquiry for Southern grades. The foundry melt shows little change. Foundries generally have bought conservatively in the past few months and are taking all of the iron they have contracted for. Prices on foundry grades are stationary and firm, No. 2 foundry being generally held at a minimum price of $13.50 for No. 2 for shipment from Cleveland and Valley furnaces. For Cleveland delivery we quote as follows, delivered, for prompt shipment and for the last half:

Bessemer	$15.90
Basic	$13.75 to 14.00
Northern foundry No. 2	13.75 to 14.00
Gray forge	13.25
Southern foundry No. 2	14.60 to 14.85
Jackson Co. silvery, 8 per cent. silicon	17.55

Coke.—There is no demand for furnace grades. The foundry coke market is quiet, sales being limited to small lots for early shipment. Prices are stationary and firm. We quote standard Connellsville furnace coke at $1.50 to $1.60 per ton, at oven, for prompt shipment, and $1.60 to $1.70 for the remainder of the year. Connellsville 72-hr. foundry coke is held at $1.85 to $2.15 for prompt delivery and $2.10 to $2.40 for contract.

Finished Iron and Steel.—The demand is fair, the tonnage in specifications and contracts being about the same as in the previous few weeks. Orders are quite numerous, but they are nearly all for quite small lots. With the general lack of firmness, buyers not already under contract, as a rule, are buying material as they need it. The steel bar price situation shows little change. Orders for carload lots and over are being taken on the basis of 1.20c., Pittsburgh, for immediate specification, but mills are not disposed to take contracts at this price for the remainder of the year. Hard steel bars are quoted at a minimum price of 1.10c. There is not much activity in the plate market; much of the business is being taken at a concession of $1 a ton, although boiler plates are firmer than tank plates. The demand for structural material is less active than a few weeks ago, and local fabricating plants are not very well filled with work. There are occasional rumors of price cutting on structural material, but as far as this territory is concerned they appear to be unfounded. No new structural work of any size has come out. The McMyler Interstate Company, Bedford, Ohio, has taken 500 tons for a power house for the Lake Shore Railroad at Elkhart, Ind., 350 tons for the Kelly Island Lime & Transportation Company, Marblehead, Ohio, and 200 tons for a plant for the Sunshine Cloak & Suit Company, Cleveland. The demand for sheets is not active and concessions of $2 a ton are now quite prevalent. A local mill reports the sale of 2000 tons of billets to a northern Ohio consumer. Rivet prices are irregular and the demand is not active. Local bar iron mills are booking only a moderate tonnage in orders. The Empire mill has resumed operations after a shutdown of a week. We quote iron bars at 1.25c. to 1.30c., Cleveland.

Old Material.—With liberal offerings by both dealers and producers, and a falling off in the demand because mills generally are under contract for their requirements for some time, the market has become dull and prices on several grades show a further decline of from 25c. to 50c. a ton. Two or three mills have placed an embargo on scrap, and this also has had a depressing effect. With no demand for busheling, that grade is particularly weak. Although mills are generally well

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supplied, some will take on additional tonnages of steel-making scrap if sellers quote prices that are regarded as satisfactory. Dealers' prices, per gros ton, f.o.b. Cleveland, are as follows:

Old steel rails, rerolling	$13.00 to $13.25
Old iron rails	15.00 to 15.50
Steel car axles	17.50 to 18.00
Heavy melting steel	11.75 to 12.00
Old car wheels	12.00 to 12.25
Relaying rails, 50 lb. and over	22.50 to 23.50
Agricultural malleable	10.75 to 11.25
Railroad malleable	12.25 to 12.75
Light bundled sheet scrap	10.00 to 10.50

The following prices are per net ton, f.o.b. Cleveland:

Iron car axles	$20.50 to $21.00
Cast borings	6.50 to 6.75
Iron and steel turnings and drillings	7.00 to 7.25
Steel axle turnings	8.25 to 8.75
No. 1 busheling	9.50 to 10.00
No. 1 railroad wrought	11.75 to 12.00
No. 1 cast	11.25 to 11.75
Stove plate	9.50 to 10.00
Bundled tin scrap	11.00 to 11.50

Birmingham

BIRMINGHAM, ALA., August 28, 1911.

Pig Iron.—It is now practically certain that the proposed addition to the output of foundry iron mentioned in last report will not be made in the near future. The quantity of iron so far sold this month has been rather disappointing to producing interests generally, and especially noticeable is the small percentage of sales effected at a higher basis than $10, Birmingham, for No. 2 foundry. Of the inquiries pending at the time of last report a very small proportion has so far resulted in sales, but the $10.50 basis has no doubt been fully maintained. A lot of 750 tons of high silicon iron with a very high manganese content, for shipment in the last quarter, was sold at $12.50, Birmingham. Of the sales reported at the $10.50 basis, a lot of 700 tons of No. 2 soft for shipment covering the remainder of the year was the largest. A lot of 600 tons of No. 1 soft for immediate shipment was sold at $11, and 300 tons of No. 3 foundry for shipment over the next sixty days brought $10. With the exception of the several lots just mentioned the demand was largely for carloads and lots of 100 to 150 tons, all of which was for early delivery. There has been some complaint the past fortnight of inability to ship against contract at the rate originally agreed upon, although the actual melt is not believed to have been decreased. At this time a few lots of 1000 to 1500 tons each for shipment over the remainder of the year are pending, and considerably more interest in first quarter deliveries is being manifested by the large melters. The attitude of the producing interests as to first-quarter commitments is accounted for largely by the comparatively small tonnage now on order books for shipment during the last quarter, and the consequent expectation of a fairly heavy buying movement for that requirement. It is conceded that with the further reduction in stocks which reports of September 1 are expected to show, as made during the month of August, and the rate of production unchanged, the $10.50 schedule will necessarily be maintained. However, in certain directions developments as to the extent the trade has provided for advanced requirements at the $10 basis are awaited with considerable interest. For prompt shipment or delivery over the remainder of the year we quote the schedule below, per gross ton, f. o. b. cars Birmingham furnaces:

No. 1 soft and No. 1 foundry	$11.00
No. 2 soft and No. 2 foundry	10.50
No. 3 foundry	10.00
No. 4 foundry	9.75
Gray forge	9.50
Mottled	9.25
Off basic	$10.00 to 10.50
Standard basic	10.25 to 10.75
Charcoal car-wheel iron	22.50

Cast-Iron Pipe.—Mention is now made of a lot of 4000 tons of water pipe soon to be placed at San Diego, Cal., and specifications for additional requirements at San Francisco are soon to be submitted for bids. The past week some 1200 tons of water pipe was placed by the city of Los Angeles, Cal., and 700 tons for St. Louis, Mo., was also awarded. This last mentioned went to Eastern producers, while the Los Angeles contract was divided between the American Cast Iron Pipe Company and the United States Cast Iron Pipe & Foundry Company. A number of small contracts are soon to come up, and order books generally are fairly well taken care of. A local plant is practically out of the market for certain sizes, and as a result there is some variation in prices being submitted. We continue to quote the market as follows, per net ton, f. o. b. cars here, for water pipe: 4 to 6 in., $23; 8 to 12 in., $22; over 12 in., average $21, with $1 per ton extra for gas pipe.

Old Material.—The sale of 100 tons of melting steel scrap is reported, and several carloads of light cast and machinery cast changed hands. The consumption has not increased materially, although a fair tonnage is being moved to Atlanta, Ga., and Knoxville, Tenn., mills. It is not known when the Alabama City plant will be put in operation. We continue to quote dealers' asking prices as follows, per net ton, f. o. b. cars here:

Old iron axles (light)	$13.50 to $14.00
Old steel axles (light)	12.50 to 13.50
Old iron rails	12.50 to 13.00
No. 1 railroad wrought	11.00 to 11.50
No. 2 railroad wrought	9.50 to 10.00
No. 1 country wrought	7.50 to 8.00
No. 2 country wrought	7.00 to 7.50
No. 1 machinery	9.50 to 10.50
No. 1 steel	8.50 to 9.00
Tram car wheels	8.00 to 8.50
Standard car wheels	9.50 to 10.50
Light cast and stove plate	7.00 to 7.50

Buffalo

BUFFALO, N. Y., August 29, 1911.

Pig Iron.—The week has developed more activity and larger inquiry, the situation thus showing features of improvement. Most furnaces in this district now have bookings covering a large percentage of their capacity over the remainder of the year and are not seeking spot shipment business as eagerly as they were and the prices of such furnaces are again closely approximating the advanced figures asked a month or so ago. The generally established price for No. 2X for spot and fourth quarter is $13.50, with some furnaces asking $13.75, Buffalo. The bulk of the inquiry now being received is for 1912 delivery; but furnaces will not take on such business at present prices and are asking about 50 cents per ton additional over current schedules for first half delivery. Sales for the week aggregate a good tonnage, including a number of orders for 1000 tons and over and several only slightly smaller and one good-sized order for malleable, all for fourth quarter delivery. Shipments on contracts are large and from most furnaces equal or exceed the current production. We quote as follows, f.o.b. Buffalo, for spot and fourth quarter shipment:

No. 1 X foundry	$13.75 to $14.00
No. 2 X foundry	13.50 to 13.75
No. 2 plain	13.50
No. 3 foundry	13.25 to 13.50
Gray forge	13.25 to 13.50
Malleable	13.75 to 14.25
Basic	13.75 to 14.25
Charcoal	16.50 to 17.50

Old Material.—The market is a little less active as compared with last week, with a smaller demand for most grades except railroad malleable, and prices are not quite so firm. The demand from outside districts for turnings and borings has fallen off and prices on these two commodities have dropped slightly. We quote as follows, per gross ton, f.o.b. Buffalo:

Heavy melting steel	$13.00 to $13.50
Low phosphorus steel	16.00 to 16.50
No. 1 railroad wrought	14.00 to 14.50
No. 1 railroad and machinery cast scrap	13.75 to 14.25
Old steel axles	18.50 to 19.00
Old iron axles	22.00 to 22.50
Old car wheels	13.00 to 13.50
Railroad malleable	13.00 to 13.25
Boiler plate	12.50 to 13.00
Locomotive grate bars	11.00 to 11.50
Pipe	9.25 to 9.50
Wrought iron and soft steel turnings	7.25 to 7.50
Clean cast borings	7.00 to 7.25

Finished Iron and Steel.—Most lines show a slight improvement. The demand is better for plain structural material and prices are a little firmer. The general situation as to all products, including steel bars, is one of hopefulness. There is a disposition on the part of some large buyers of sheets to come into the market for their requirements for the first quarter of next year, and in one or two instances an offer has been made for the first six months of the year. These inquiries came from the closest buyers, which would be an indication that they felt that the bottom had been reached. The marked activity in fabricating shops continues and is the distinctive feature of the market. Many shops are working overtime and some are working double shift, and prices are firmer. Plans have been completed and bids are soon to be received

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for the New York Telephone Company's 15-story office building in Buffalo, which will require about 2000 tons of steel; the Washington B. French store and office building, 150 tons; the Magnus Beck Café building, Layfayette square, 100 tons, and an addition to the Flint & Kent department store, 200 tons. Bids are being received this week for the steel for St. Mary's Hospital, Niagara Falls, 600 tons; St. Vincent's Hospital, Erie, Pa., 100 tons, and the Great Meadows prison at Comstock, N. Y., 800 tons.

New York

NEW YORK, August 30, 1911.

Pig Iron.—A number of inquiries have appeared in the past week for pig iron for the first quarter and the first half of 1912. As a rule the furnaces are not seeking business for these deliveries, but it is known that some sales have been made carrying, for the most part, deliveries in the last four months of this year, but with the privilege of extending them for a month or two into 1912. Prices in these cases were not above what have been current for 1911 delivery. One New Jersey interest has bought 400 tons for this year in the past week, and another, a large consumer, came into the market on Monday for about 800 tons. This latter company has been buying from time to time in the past month for both Eastern and Central Western plants. Foundries in this district are not disposed to pay the advances furnaces want to get for next year, and seem content to wait a little longer. A year ago a considerable amount of iron for the early part of this year was under contract, the buying having begun in June. There has been some activity in the Buffalo district and sales have been made in a few cases for delivery over the first quarter and the first half of next year. Several thousand tons of this iron will go to Canada, where, with a duty of $2.80 on American pig iron as against $1.68 for British iron, the former is sold at $1.50 to $2 a ton above the possible delivered price of Middlesbrough iron. The latter being high in phosphorus is only desired in a small percentage in the mixtures of foundries which depend largely on the Buffalo district. For delivery this year there is still a variation of nearly 50 cents between the lowest and highest quotations on shipments out of Buffalo. As low as $13.25, Buffalo, on No. 2 has been named in the past week for this year's iron. We quote Northern iron for tidewater delivery as follows: No. 1 foundry, $15.50 to $15.75; No. 2 X, $15 to $15.25; No. 2 plain, $14.75 to $15. Southern iron is quoted at $15.25 to $15.50 for No. 1 foundry and at $14.75 to $15 for No. 2.

Finished Iron and Steel.—A diminishing demand for finished steel is the disturbing element at the present time and is regarded as forecasting an extended period of dullness. A fair volume of steel work for structural purposes was closed during the week, but the largest single contract was one of 2500 tons for an apartment house at Park avenue and Fifty-second street, New York, given to the American Bridge Company. A few large propositions are still undecided and practically all that remains is the general run of small business, which is holding up fairly well. No features of importance have developed in plates, which are moving in the same volume which has obtained for several weeks. Steel bars again show weakness, but not enough sales have been reported to gauge the extent of the price cutting. Business in bar iron is being maintained at last week's improved rate and prices seem to be firm except that one case is known of a large buyer securing a carload of bar iron at 1.28c. Among the structural awards made are the following: Brigham Hospital, Boston, 970 tons, to Lackawanna Steel Company; bridge for the Central Railroad of New Jersey at Cranford, N. J., 300 tons; two bridges for the same railroad at Roselle, N. J., 200 tons, and the Park street bridge of the New York, New Haven & Hartford Railroad, 200 tons, all three contracts to the Pennsylvania Steel Company; the Chase Rolling Mill building, Waterbury, Conn., 250 tons, to Jones & Laughlin Steel Company; a loft building on West Sixteenth street, New York, 550 tons, to the Harris-Silvers Company; an apartment house on West Seventy-first street, 300 tons, to Ravitch Brothers, and to L. F. Shoemaker & Co., coal pocket at Truesdale, Pa., for the Delaware, Lackawanna & Western Railroad, 700 tons; three bridges for the New York Central, 250 tons, and Boston Elevated extension, 300 tons. The reconstruction of the burned portion of the Capitol at Albany, N. Y., will probably require not more than 400 tons of steel, but of relatively difficult character. It is probable that the garage in New York for the Locomobile Company will require 1700 or 1800 tons of steel. A three-story boiler house has been projected for the Metropolitan Museum of Art in New York, McKim, Mead & White, architects. Quotations are: Plain structural materials and plates, 1.51c. to 1.56c.; steel bars, 1.36c. to 1.41c.; bar iron, 1.30c. to 1.35c., all New York. Plain material and plates from store, New York, 1.80c. to 1.90c.

Cast Iron Pipe.—The demand from private buyers continues to show fair activity. Quantities purchased in this manner, however, have not been large, although the total tonnage thus booked is quite considerable. Public lettings are few and far apart. Carload lots of 6-in. continue to be quoted at $21 to $22 per net ton, tidewater.

Old Material.—The market has weakened decidedly. Large consumers of steel scrap and rolling material are becoming overstocked and are requesting dealers to suspend shipments on contracts for the present. Under such circumstances buying is practically at a standstill. On some classes of old material absolutely no demand can be found and prices are therefore completely nominal. The foundries are buying but sparingly, so that all grades of cast scrap are abundant and weak. The supply of scrap of all kinds appears to be excessive. Quotations are as follows, per gross ton, New York and vicinity:

Old girder and T-rails for melting	$10.25 to $10.50
Heavy melting steel scrap	10.25 to 10.50
Relaying rails	20.50 to 21.50
Rerolling rails (nominal)	12.00 to 12.50
Standard hammered iron car axles	21.50 to 22.00
Old steel car axles	16.00 to 16.50
No. 1 railroad wrought	12.75 to 13.25
Wrought iron track scrap	11.00 to 11.50
No. 1 yard wrought, long	11.00 to 11.50
No. 1 yard wrought, short	10.00 to 10.50
Light iron	4.25 to 4.75
Cast borings	6.00 to 6.50
Wrought turnings	6.50 to 7.00
Wrought pipe	10.00 to 10.50
Old car wheels	10.50 to 11.00
No. 1 heavy cast, broken up	10.50 to 11.00
Stove plate	8.50 to 9.00
Locomotive grate bars	8.50 to 9.00
Malleable cast	10.50 to 11.00

Ferroalloys.—Dealers here are quoting 50 per cent. ferrosilicon at $57, Pittsburgh. Some resales of ferrosilicon are rumored to have been made at $55, but these cannot be confirmed. There is very little call for ferromanganese in this vicinity, but some excellent inquiries are out from other localities for next year's delivery. The market here is firm at $37, Baltimore, for the remainder of the year and $37.50 for delivery over the first half of 1912.

Metal Market

NEW YORK, August 30, 1911.

The Week's Prices

Cents Per Pound for Early Delivery.

	Copper, New York.			Lead.		Spelter.	
Aug.	Lake.	Electrolytic.	Tin. New York.	New York.	St. Louis.	New York.	St. Louis.
24	12.75	12 50	45.00	4.50	4.42½	6.10	5.95
25	12.75	12.50	44.00	4.50	4.42½	6.10	5.95
26	12.75	12.50	.....	4.50	4.42½	6.10	5.95
28	12.75	12.50	42.87½	4.50	4.42½	6.05	5 90
29	12.75	12.50	42.87½	4.50	4.42½	6.05	5.90
30	12.75	12.50	42.87½	4.50	4.42½	6.05	5.90

Dullness still prevails in the copper situation. Expected arrivals of pig tin are having their effect on the market, and the premium recently asked is about off. Spelter is 5c. per 100 lb. lower. Antimony is plentiful with but few sales. Lead is dull and uninteresting.

Copper.—The quietness in the demand for copper which prevailed last week is still felt. There are some rumors of large sales of electrolytic having been made by important interests for delivery in October, but these cannot be confirmed. Prices remain unchanged, with Lake quoted at 12.75c. and electrolytic at 12.50c. The exports so far this month are 24,148 tons. The London market this morning was steady, with spot copper offered at £56 2s 6d and futures at £56 15s.

Pig Tin.—The market in pig tin is steady. The supplies are very low and the arrivals of tin afloat are anxiously awaited. It is reported that there are 1200 tons on the steamers Mesaba and Minnetonka and about 900 tons on steamers unknown which are expected to arrive before September 10. It is believed that this will not materially help the situation,

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as these stocks are expected to be absorbed on account of the shortage. Spot tin is being quoted at 42.87½c. cash, and deliveries dated ahead 10 to 12 days are bringing 42.15c. The London market this morning is reported easy, with spot tin offered at £189 15s. and futures at £187 5s. The arrivals of tin so far this month were 3212 tons.

Tin Plates.—There is no material change in the market for tin plates. The mills are expected to continue at about the same rate of production as earlier in the month for a few weeks, at least. The demand for small quantities is fair, and prices remain unchanged at $3.94 for 100 lb. coke plates. Foreign tin plates are quoted at 13s. 9d. at Swansea, Wales.

Lead.—The New York and St .Louis markets are easy and some small sales are reported but not enough business is being done to change the quotations made last week of 4.50c. New York, and 4.42½c. St. Louis.

Spelter.—The price of spelter dropped 5c. per 100 lb. early in the week, and this price has not advanced since. The demand is for prompt shipment and only for small lots, and consumers show no intention of stocking up. Spelter is quoted at 6.05c. New York, with the St. Louis quotation at 5.90c.

Antimony.—Before the rise a great many consumers stocked up and the fluctuations caused by the attempted corner did not affect them very much. The metal is cheap at present prices, but there is practically no demand and quotations are nominal. Hallett's is offered at 7.75c., Cookson's at 8.37½c., and for other brands 7.37½c. is being asked.

Old Metals.—Business is very quiet. Dealers' selling prices, New York, are unchanged, as follows:

Copper, heavy cut and crucible	$12.00 to $12.25
Copper, heavy and wire	11.50 to 11.75
Copper, light and bottoms	10.75 to 11.00
Brass, heavy	8.00 to 8.25
Brass, light	6.75 to 7.00
Heavy machine composition	10.50 to 10.75
Composition turnings	8.75 to 9.00
Clean brass turnings	8.00 to 8.25
Lead, heavy	4.20 to 4.25
Lead, tea	3.95 to 4.00
Zinc, scrap	4.25 to 4.30

Chicago

AUGUST 28.—Copper yielded slightly under pressure during the week, and the price for Lake is slightly lower. Tin quotations were marked by violent fluctuations, following the strained situation of a week ago. Trade in general is dull. We have revised our quotations for Chicago delivery as follows: Casting copper, 12.65c.; Lake 12⅞c., in carloads, for prompt shipment; small lots, ¼c. to ⅜c. higher; pig tin, carloads, 44c.; small lots, 46c.; lead, desilverized, 4.45c. to 4.50c. for 50-ton lots; corroding, 4.72½c. to 4.75c. for 50-ton lots; in carloads, 2½ c. per 100 lb. higher; spelter, 5.90c. to 5.95c.; Cookson's antimony, 9¼c., and other grades, 8¼c. to 8¾c., in small lots; sheet zinc is $8 f.o.b. La Salle, in carloads of 600-lb. casks. On old metals we quote for less than carload lots: Copper wire, crucible shapes, 10¾c.; copper bottoms, 9½c.; copper clips, 10¼c; red brass, 9½c.; yellow brass, 7½c.; lead pipe, 4c.; zinc, 5c.; pewter, No. 1, 26c.; tinfoil, 33c.; block tin pipe, 37c.

St. Louis

AUGUST 28.—The metal market shows a softening tendency pretty much all along the line. Tin is off to 43.85c., while antimony is barely held at 8.72½c. for Cookson's. Lake copper is 13.05c., which is unchanged, but electrolytic is off to 12.90c. There was a good volume of business all the past week and the new week has started off at a fair gait. Lead is quotable at 4.42½c. bid and 4.45c. asked, while spelter is quoted at 5.85c. to 5.90c. In the Joplin zinc market the top price was $48 per ton, some selling as low as $44. Practically all the ore in the camp was cleaned up in the Galena, Kan., district. Ore producers in the Joplin camps are showing a disposition to hold for an improvement in the spelter market. Calamine has been firm at $22 to $24 per ton, with $30 as the top price. Lead ore has been strong at $60 to $63 per ton. Following are the prices on old metals: Light brass, 5c.; heavy brass and light copper, 8c.; heavy copper and copper wire, 9c.; zinc, 3c.; lead, 3¼c.; pewter, 20c.; tin foil, 29c.; tea lead, 3c.

The General Vehicle Company, Long Island City, last week sold more than $1,000,000 worth of electric motor trucks to brewers. One large brewer bought 19, and now has 43 such trucks in service.

Iron and Industrial Stocks

NEW YORK, August 30, 1911.

Persistent liquidation, which continued until Saturday, caused prices of numerous stocks to sag decidedly. While the sales were heavy on some days, at no time did the movement take on an appearance of demoralization. A check to the selling occurred on Monday of this week, when most prices advanced, but on Tuesday they again declined. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Allis-Chalmers, pref.	17 - 18	Pressed Steel, pref..	97
Beth. Steel, com....	29 - 30¼	Railway Springs, com	30 - 32
Beth. Steel, pref...	58½ - 60⅝	Railway Springs, pref.....	100⅞
Can, com.....	9¼ - 10	Republic, com.....	24⅜ - 27
Can; pref.....	82¾ - 84½	Republic, pref.....	89 - 92
Car & Fdry, com...	48½ - 50½	Sloss, com.....	36 - 42
Car & Fdry, pref...	115½	Pipe, com.....	13 - 14¾
Steel Foundries.....	33 - 35	Pipe, pref.....	46⅛ - 48⅝
Colorado Fuel.....	28 - 29⅜	U. S. Steel, com....	69¼ - 73
General Electric....	150¾ - 153	U. S. Steel, pref...	114 - 115¾
Gr. N. Ore Cert....	47⅛ - 48¼	Westinghouse Elec..	63⅞ - 66
Int. Harv., com....	108½ - 115	Am. Ship, com.....	56
Int. Harv., pref....	121½ - 122	Chic. Pneu. Tool...	47 - 47¼
Int. Pump, com....	32⅞ - 34½	Cambria Steel.....	44 - 44½
Locomotive, com....	34½ - 36½	Lake Sup. Corp....	23 - 24½
Locomotive, pref....	104¾ - 105	Crucible Steel, com.	11¾ - 12
Pressed Steel, com..	30 - 31	Crucible Steel, pref.	79½ - 81¼

Dividends Declared

The American Locomotive Company, regular quarterly of 1¾ per cent. on the preferred stock, payable October 21.

The Railway Steel Spring Company, regular quarterly dividend of 1¾ per cent. on the preferred stock, payable September 20.

The Republic Iron & Steel Company, regular quarterly of 1¾ per cent. on the preferred stock, payable October 2.

The American Can Company, regular quarterly of 1¼ per cent. on the preferred stock, payable October 2.

Trade Publications

Fluxes.—International Flux Company, Inc., Evansville, Ind. Pamphlet. Concerned with the Keystone thermal flux for general foundry work and the Jewett bronze alloy flux, the uses of which are discussed at length together with the advantages resulting from their use.

Steam Specialties.—John Acton, 118 John street, Brooklyn, N. Y. Pamphlet. Illustrations and descriptive matter explain the operation of an extensive line of automatic steam, water, air and vacuum specialties. These include reducing and relief valves, turbine vacuum valves, an automatic pump receiver and regulator, grease extractor, thermostat, governor and steam traps.

Linseed Oil.—Sterling Varnish Company, Pittsburgh, Pa. Folder entitled, "The Improvement of Linseed Oil and Its Effect on Paint." Discusses the advantages of the company's refined linseed oil from which the mucilaginous and watery impurities have been eliminated with the result that cracking of the paint due to the dissolution of the soluble impurities has been overcome. One of the special features of paint made with this oil is that there is nothing in the oil film which is soluble in water. In this way it is not possible for destructive agents to penetrate a paint coating in which this oil is used and a very hard film that is said to be the nearest practical approach to flexible glass is secured.

Friction Clutch.—Dodge Mfg. Company, Mishawaka, Ind. Pamphlet. Pertains to the Orton type of solid friction clutch, which is made in a wide range of sizes for transmitting from 2 to 50 hp. at 100 r.p.m. Phantom and sectional views showing the construction of the clutch are given together with brief dimension tables. An illustrated list of repair parts with prices completes the pamphlet.

Dynamometers and Small Electric Motors.—Sprague Electric Works of the General Electric Company, 527 West Thirty-fourth street, New York City. Two bulletins. The first, No. 112, superseding No. 108, deals with the Sprague electric dynamometers for measuring the power generated by gas and steam engines, turbines and motors or the power required to drive any piece of apparatus. Its construction and use are described at length and the text is supplemented by half-tone engravings. No. 236 describes and illustrates a line of small motors for direct and alternating current.

Metal Sheets.—Newport Rolling Mill Company, Newport, Ky. Mailing card. Pertains to the line of genuine open-hearth iron sheets made by this company, which are said to be rust-resisting and anti-corrosive. A number of illustrations of the different types of sheets, which can be furnished with either black or galvanized finish, are included.

Customs Decisions

Earthenware and Metal Steam Exhausters

The Board of United States General Appraisers has decided that steam exhausters made of earthenware and metal should be given lower duty. They were assessed under paragraph 96 of the tariff act of 1897 at 55 per cent. and were claimed dutiable at various lower rates. The chief claim made by the Didier-March Company, the importer, is that the merchandise should be admitted at 20 per cent. ad valorem under the provision for non-enumerated articles under section 6. Judge Hay, in his decision for the Board, states that the testimony shows that the earthenware is of chief value, and that the articles are not according to the usual commercial practice susceptible of decoration. The General Appraiser says that the articles in question not being susceptible of decoration are not classifiable under the paragraphs assessed. The articles must, according to Justice Hay, be relegated to Section 6, which propides for "non-enumerated articles." The protest is sustained and the collector reversed.

Metal Drums

Arnold, Hoffmann & Co., and others were successful in securing from the Board lower duty on metal drums used in the conveyance of chemicals. The drums are made of sheet steel and are cylindrical. They were assessed at 30 per cent. ad valorem as "unusual" coverings. It is claimed that the coverings are "usual," and therefore free of duty, or that they are dutiable at the rate applicable to their contents. It is held that as the containers or coverings are of no commercial value after being used they possess no assessable value.

The David Lupton's Sons Company, Philadelphia, Pa., through its Pittsburgh office, 1415 Oliver Building, has closed a contract with the Pressed Steel Car Company for steel sash for its new shearing and light pressing building, which will be 532 ft. long and will have Lupton counterbalanced steel sash in the side walls with Pond continuous sash operated by Pond operating device in the monitor, and will be one of the first buildings in the Pittsburgh district having this construction for light and ventilating effect.

The necessity of purchasing torpedoes for the American Navy in foreign countries is past, in the belief of officials of the Navy Department. The government torpedo station at Newport, R. I., and the private manufacturers of torpedoes in this country are thought now to be in a position to meet all the requirements of the United States.

A Philadelphia dispatch says that the strike at the Baldwin Locomotive Works, which began on June 8, was officially called off August 28 by the Executive Committee of the Locomotive Builders' Council. Of the 12,000 men who went out it is stated that only about 2000 are now idle. The international officers of affiliated unions advised against the strike on the ground that these unions were not in position to pay strike benefits.

The Ball Engine Company, Erie, Pa., builder of automatic cut-off engines, is adding a connecting building to its plant, 40 x 160 ft., of brick and steel construction. It will be equipped with a 20-ton crane which has been purchased.

The Skinner Engine Company, Erie, Pa., builder of high-grade automatic engines, has recently built a new foundry of about 15 tons daily capacity, entirely for its own work. It expects to make some additions to its machine shop next year, but plans have not yet been fully drawn.

Linsine is a product manufactured by the Red Star Oil Company, 1307 Pearl street, Philadelphia, Pa., as a substitute for linseed oil for painting of all kinds. It is explained that the cost is low and that it is a firm-drying, waterproof vehicle for pigments. Special emphasis is placed on its availability for protecting structural metal.

The Columbia Novelty Mfg. Company, 143-1433 North Eighth street, St. Louis, Mo., has purchased adjoining ground and will erect an addition this fall, doubling its floor space. The company is building special automatic machines to produce belt hooks from wire and also machines for increasing its output of Stag steel belt hooks. Busines: at present is only fair, but indications point to an improvement at an early date.

The Crocker-Wheeler Company, Ampere, N. J., has opened offices in San Francisco, Cal., located in the First National Bank Building, room 401. John S. Baker, well known in the Pacific Coast electrical trade, has been placed in charge, and motors, generators and transformers of various sizes will be carried in stock for immediate shipment.

The Sheffield Tool Steel Company, 60 Elm street, Cincinnati, Ohio, has been appointed exclusive sales agent for Toledo tool steel, manufactured by Jno. Hy. Andrews & Co., Ltd., Sheffield, England, for Cincinnati and surrounding territory, and will carry complete stocks of all grades, including Toledo high-speed steel.

New Tools and Appliances

This is essentially a news department for which information is invited.

Quick-Acting Clamp.—George H. Wrigley, 47 South Sixty-first street, Philadelphia, Pa., is manufacturing a quick-acting clamp for structural and general machine shop use. The clamp is operated by a screw having a lock nut above the head which can be set for any given size and will retain its setting. The clamp is applied or released by a lever on the opposite side from the lock nut which enables considerable time to be saved and gives the clamp its name. The head has a recess in it which enables the button on the end of the screw to recede and give the full working capacity of the clamp, which varies from zero to 7½ in.

Saw Blade with Inserted Teeth.—The Hunter Saw & Machine Company, Pittsburgh, Pa., has recently placed on the market an inserted tooth saw blade for cutting bars, forgings, steel castings, rails, frogs and switches. A vanadium alloy tool steel is employed for the body of the blade, while the teeth are made of high-speed steel, and both parts are hardened and treated. Interchangeable tool-steel wedges bearing against a brass adjusting screw hold the teeth in place and at the same time secure a uniform height.

Compression Grip Drill Socket.—McFarlane & Little, 15 North Seventh street, Philadelphia, Pa., have recently placed on the market a new type of grip socket for taper shank drills and reamers. The socket is made of steel and the coiled steel grip is tempered and ground to a correct taper both externally and internally. The socket works on the same principle as a coil clutch, and will hold and drive taper shank tools the tangs of which have been broken.

Two New Drill Holders.—Two new types of quick acting drill holders have been brought out by the Krieger Tool & Mfg. Company, Grand Rapids, Ill. In one of these holders a floating center is used which will hold drills having either straight or taper shanks and varying in diameter from ¼ to ¾ in. In the second type of holder a swiveling tongue dog is used as well as the floating center.

Wet Tool Grinder.—Guy G. Townsend, Winchendon, Mass., has recently designed a wet tool grinder with an exceptionally large pan for retaining the water used. The machine is equipped with a pump and the supply of water is regulated by a valve controlled by a long handle extending out underneath the pan. The grinding wheel used has a diameter of 16 in. and a face 12 in. wide. All the parts of the machine have been machined and fitted and the nuts and screws are case hardened. The complete weight of the machine, including the crucible steel countershaft, is approximately 100 lb.

Obituary

James Christie

James Christie, of Philadelphia, one of the foremost mechanical engineers of the country, president of the Engineers' Club of Philadelphia and vice-president of the Franklin Institute, died at his Atlantic City home August 24, as the result of a stroke of apoplexy. He was born at Ottawa, Canada, August 28, 1840, and was educated in the local public schools. When he was 16 years old he became a machinist's apprentice at the locomotive works at Detroit, Mich. This establishment failed soon afterward and he went to Missouri, where he spent the year 1858 in the engineering and construction corps of what was then the Southwest branch of the Missouri Pacific Railroad, now the St. Louis & San Francisco Railroad. The following year he entered the service of the I. P. Morris Company, Philadelphia, where he remained for five years as a machinist and mechanical draftsman. During the Civil War he participated in the battle of Antietam and in the following year enlisted with the Engineer Corps. In 1865 he went to Pittsburgh, where his first work was on designs in connection with the building of the Cyclops Iron Works, since then becoming the Thirty-third Street mill of the Carnegie Steel Company. Bridgebuilding next attracted his attention, and in 1870 he came associated with Alfred P. Boller in establishing bridge works at Phillipsburg, N. J., and also served as a member of the City Council and as mayor. Attaining a reputation as a builder of bridges he was, in 1876, appointed chief engineer of the Pencoyd Iron Works of A. & P. Roberts & Co., Philadelphia, retaining that position after the consolidation with the American Bridge Company, resigning in 1905. He was an active member of the American Society of Civil Engineers, the American Association for the Advancement of Science and the American Society of Mechanical Engineers. He also served, in 1907, as a member of Select Council of Philadelphia. He leaves a widow and four children.

WALTER HUBBARD, Meriden, Conn., founder and for years head of the Bradley & Hubbard Mfg. Company, died suddenly August 24, aged 83 years. He was born in Middletown, Conn., and in his younger days was engaged in mercantile business, conducting a store at Meriden, from 1852 to 1860. The business of the Bradley & Hubbard Mfg. Company was established in 1854 for the manufacture of hardware specialties, his partner being N. L. Bradley, his brother-in-law. For 25 years he was the president of the corporation and head of the business, and built up the industry to one of large magnitude. He had been president of the Meriden Gas Light Company, the Meriden Electric Light Company and the Meriden Trust & Safe Deposit Company, and was interested in other banking and industrial institutions. He was a member of the Union League Club of New York, the New England Society of New York and the American Geographical Society. His philanthropic munificence was noteworthy, including the gift of a magnificent park to Meriden.

ORRIN BRYANT, head of O. Bryant, Sons & Co., manufacturers of special radiator machinery, Buffalo, N. Y., died at his residence in that city August 14, aged 74 years. He went to Buffalo from Westfield, Mass., in 1886, and with John B. Pierce and Joseph Bond built the radiator plant now known as the Pierce plant of the American Radiator Company. He continued that as master mechanic until 1893, when he withdrew and later established with his sons the business with which he continued active until his last illness. He acquired considerable reputation as an inventor.

FREDERICK LEWIS WAGNER, New York, Eastern manager for the Carpenter Steel Company, died August 22, after a long illness, aged 27 years. He was the son of the late Albert Wagner, a well-known architect. He leaves a widow.

JOHN H. KING, a retired steel and iron manufacturer, died at his home in Fair Haven, Conn., August 29, from chronic nephritis, aged 71 years. He was a friend and business associate of John D. Rockefeller and John D. Archbold. He was senior partner in the firm of King, Gilbert & Warner, at Columbus, Ohio, operating a steel plant which was absorbed by the National Steel Company and afterward by the United States Steel Corporation. Twelve years ago Mr. King retired from active business and went to live in Fair Haven. He leaves a widow and daughter.

W. H. LATSHAW, for many years vice-president of the Pennsylvania Tube Works, died at his home in Pittsburgh, Pa., August 29, aged 56 years. He was born in Pittsburgh. Until 1903, when he retired from active business on account of failing health, he was one of the most prominent figures in the industrial and commercial life of that city.

Metal Corrosion in Gaseous Atmosphere

Some tests of the rate of corrosion of metals exposed in a gaseous atmosphere were made the subject of a paper by A. W. Carpenter, engineer of structures, New York Central & Hudson River Railroad, presented to the annual meeting of the American Society for Testing Materials. Pieces of the metals, generally in the form of thin sheets, were exposed in two places, one in a tunnel where the atmosphere is very highly charged with locomotive gases and steam, the other the interior of a smoke-jack in an engine house. In the tunnel exposure the specimens were attached to a wooden frame fastened to one side of the tunnel, in which location they received no blast action from locomotives and it was thought that all would be exposed to equal conditions. In the smoke-jack the plates were hung inside the jack so that the conditions would probably be equal for all plates.

A plate of special iron exposed in the smoke-jack for 189 days corroded at the rate of about 1/32 in. per annum for each surface, or 1/16 in. per annum for a plate with both sides exposed.

The tunnel test showed resistances to corrosion in the following order, beginning with the most resistant, and with a loss after 289 days total exposure as given:

Corrosion of Metal 289 Days in Tunnel

	Loss, grams per sq. in surface.
Special-coated metal	0.51
Soft steel, uncoated	0.55
Special galvanized iron	0.67
Special iron, uncoated	1.72

The excessive corrosion of the special uncoated iron over that of the others will be noted. The amount of this corrosion, compared with that of the similar material in the smoke-jack tests, showed the tunnel conditions to be very much less severe than those of the smoke-jack.

In the smoke-jack one of the special-coated plates, one special iron galvanized plate and one special iron plain plate were exposed. At the first examination, after 65 days' exposure, the special-coated metal showed very much less corrosion than the special iron plates, but this plate was lost before the second examination took place, leaving only the special iron plates, one plain and one galvanized, in this test. The galvanizing was pretty well removed during the first period of exposure (65 days) and thereafter did not assist much (although it did a little). The last examination, after a total exposure of 193 days, showed a loss about the same as that in the first series (189 days' total exposure).

A third and more extensive series of tests has been inaugurated this year, and one examination of one exposure (in tunnel, 58 days) has been made. This series includes special irons, ordinary wrought iron, various steels and some special non-ferric metal. Some of the irons and steels have galvanized coatings and some have lead coatings over the galvanizing.

Some of the results of the one examination so far recorded for this series were unexpected. The galvanized plates show the greatest loss of the ferric metals. The loss of one lead-coated plate was some 75 per cent. greater than that of the other, which might be accounted for by the difference in thickness of the respective lead coatings as indicated by the chemical analyses of the two plates, but the author does not wish to put too much weight upon this point. The average loss of the two lead-coated plates was greater than that of one of the special plain irons and the open-hearth steel angles. The special iron was accepted as the same material as the special iron of previous tests; in this examination it reversed its previous record, being the most resistant, for the short period exposed.

Lake Superior Mining Institute

Sixteenth Annual Meeting Held on the Menominee Range

Members of the Lake Superior Mining Institute to the number of 230 gathered at Crystal Falls, Mich., on the Menominee range, Tuesday, August 22, for the sixteenth annual meeting. As is the custom of the Institute, attention was given almost entirely to the developments and features of the local district. Automobiles were furnished and in these all who wished were taken, not only to the mines mentioned in the programme schedule, but to other points of individual interest. Business and technical sessions were held at Crystal Falls on Tuesday evening, and at Iron River on Wednesday afternoon.

The Menominee range divides itself naturally both as to location and ore formations into three districts, and to each locality one day of the meeting was given. On no other of the Lake Superior ranges are so diversified mining problems presented, arising in part because of the character of the ore formation and in part because of the difficulties encountered in many places in handling the overlying drift. In consequence the various methods of caving, slicing and stoping are most interestingly presented. If the meeting may be said to have had a particular trend, it was in the direction of further enlightenment as to the proper adaptation of these several systems of mining. With the exception of a few of the hard, siliceous ore mines, such as the Antoine and Munro, which are worked in the open, operations on this range are exclusively underground and the brief visits to the several properties were confined to inspections of the surface equipment.

Crystal Falls Iron Mines

At Crystal Falls on Tuesday, following lunch, which was served on the train that furnished hotel accommodations during the meeting, the first visit was made to M. A. Hanna & Co.'s Hollister mine. This property has been producing a very wet and therefore somewhat undesirable ore, and the object of particular interest was an inspection of the tube mill ore drying plant which has been installed. The mill has a capacity of 15 tons per hour, or 300 tons per day of two ten-hour shifts. Results thus far obtained show a reduction of the moisture to about 6½ per cent, and it is expected that a maximum moisture of 5 per cent will soon be possible. From the Hollister, trips were made to the Bristol, operated by Ogleby, Norton & Co., and to the Tobin mine, owned by Corrigan, McKinney & Co. The Bristol is one of the older mines of the range and has yielded about 2,500,000 tones in two grades of ore, one of high manganese analysis. A new steel-lined four-compartment shaft is now being sunk to a depth of 1000 ft. to replace the present timber-framed shaft that has been in service almost since the opening of the mine. The Tobin is one of the most prominent of the Corrigan, McKinney & Co. group at Crystal Falls. In the past few years the ore body has been considerably extended and the mine is now being opened up on the twelfth level at a depth of over 1200 ft. The equipment is unusually good, including an electric haulage system below ground, a twin Nordberg Corliss first-motion hoisting plant and a boiler plant equipped with a Green fuel economizer, an auxiliary rarely used in the mining district.

The evening meeting was held at eight o'clock in Crystal Falls, with President W. J. Richards presiding. Following the appointment of the customary auditing and nominating committees a paper was presented by C. E. Lawrence, general superintendent for Pickands, Mather & Co. in the Iron River-Stambaugh district, in which he described the welfare work done by that company. A commodious and well-appointed club house was built near the Baltic and Caspian mine locations by this company about three years ago for the use of its employees. Mr. Lawrence told of the regulation of this institution and of its influence in building up and harmonizing the working organization. This paper was followed by a very interesting description of the work being done to safeguard employees and of the safety devices being installed and developed by the Oliver Iron Mining Company. It was presented by A. M. Gow, assistant mechanical engineer of that company, and stereopticon views were used to illustrate it.

In the Iron River District

On Wednesday morning a cross country automobile drive was made from Crystal Falls to the Iron River district. This district has been especially prominent during the past few years as an attractive field for the extension of ore holdings and the list of those new engaged in development work includes almost every prominent ore interest. Among those who have more recently entered this field are the Republic Iron & Steel Company, Jones & Laughlin Steel Company, Wickwire Steel Company, and the New York State Steel Company. The Cleveland-Cliffs Iron Company has been exploring for three years, the Rogers Brown Ore Company is sinking a concrete shaft under contract with the Foundation Company at the Rogers mine, and Corrigan, McKinney & Co. have been endeavoring under great difficulties to sink a shaft at the Tully. These operations continue to make this district perhaps the most active on the old ranges.

The second Institute meeting was held on Wednesday afternoon. A considerable portion of the time was given to a discussion in which it was attempted to bring out more clearly the distinctions between the methods of mining employed at the several mines, and, on the other hand, to show that mining systems considered locally to be peculiar to certain mines were essentially forms of the generally practiced systems. An analysis of two papers presented, one by W. A. MacEachron describing the top-slicing and caving systems in operation at the Caspian mine, and the other the sub and caving system practiced at the Tobin mine, by F. C. Roberts, was offered by Prof. F. W. Spurr, of the Michigan School of Mines at Houghton. In connection with Professor Spurr's statement that after caving it was necessary to draw on all of the chutes evenly, because, instead of the ore following in from the sides, it remained standing and the movement was vertical from the surface, with the result that the surface is pulled into the ore. President Richards gave an extended outline of the method used in preventing this at Crystal Falls. Mr. Richards also described the method of opening up a room where the surface failed to come down, by under cutting along each side and caving. It was brought out that such a method as this, although somewhat similar to stoping, could not be properly characterized as such.

E. E. White of Ishpeming described the results obtained by the use of the clinometer, a device perfected and extensively tested by the Cleveland-Cliffs Iron Company in surveying diamond drill holes. Thos. B. Wyman, of the Forestry Service, presented a paper in which he analyzed the several causes of forest fires and the proportion of fires for which each was responsible. Mr. Wyman also called attention to the fact that there are extensive tracts of land from which timber has been cut which are now lying idle but upon which taxes are being paid every year. On one tract Mr. Wyman estimated that in the course of 20 years, during which time a new yield of mine timber could be raised, taxes will be paid to the amount of nearly $75,000, for which, unless new trees are raised, there will be absolutely no return. Other papers included in the programme were read by title only.

In offering a resolution submitting to the Institute the question of closer affiliation with other societies, William Kelly introduced Charles Kirchhoff, New York, president of the American Institute of Mining Engineers. Mr. Kirchhoff spoke of the advantages of team work among the various societies by means of which the local advantages of each might be pooled to the profit of all. The meeting closed with a business session, during which, by unanimous acceptance of the report of the Nominating Committee, F. W. Denton, of Houghton, Mich., was elected president for the ensuing year and E. W. Hopkins and A. J. Yungbluth were re-elected treasurer and secretary respectively. In the evening the members were entertained by the Iron River committee at Sunset Lake with a clam bake dinner.

Eastern Menominee Properties

On the last day the trip included visits to the Loretto mine at the east end of the range, to the Penn Iron Mining Company's group at Vulcan and to the Chapin mine at Iron Mountain. The Loretto mine workings extended directly under the Sturgeon River and it became necessary, both from the standpoint of safety and to save the pillars of ore supporting the roof of the mine, to divert the river. A new channel running around the mine to the west was

completed in 1909, in connection with which a number of interesting problems were presented. At the Vulcan group advantage has been taken of the waterfall where the Sturgeon river joins the Menominee, and a water-driven electric generating station has been built. Current is carried the few intervening miles to the mines where the hoisting plants are driven by motor and rope drives, and the pumps are direct-connected motor-driven centrifugals. This plant, which has been described previously, is interesting as contrasted with the water-power plant at Quinnesec Falls, where compressed air is generated and transmitted to the Chapin mine through steel pipe line to be used for operating the hoists and pumps. At the Brier Hill mine, which is a part of the Vulcan group, rather bad surface conditions made advisable the lining of the shaft with concrete. This work was not of the same nature as involved in the concrete shafts put down by the Foundation Company, but consisted simply of lining the shaft as it went down with concrete instead of timber. It was interesting as a novel procedure in this respect.

Although completed in 1908, the C Ludington shaft of the Chapin mine has been sunk since the last visit of the Institute. It was one of the first of the steel frame shafts on this range and was put down to handle the entire output of the Chapin mine, the trend of whose ore bodies is deeper in the direction of this shaft. It is down to the 17th level at a depth of 1522 ft. Of particular interest at this shaft is the old Cornish pump, known almost as widely as the Chapin mine itself. It is a compound, walking-beam engine with a capacity of 3000 gals. per min. pumping from a depth of 1500 ft., and is still in active service while at the same time a relic of earlier practice.

The Institute will meet in the copper country next year.

Chrome Steel Rails in Tunnels

Corrosion of rails exposed to tunnel gases has been found to reduce the life materially in the case of the long tunnel at Sand Patch, Pa., on the Baltimore & Ohio Railroad, says the Engineering Record. This tunnel is 4775 ft. long and is operated with double-track traffic on a single-track line. The interior condition is one of practically continual dampness, with locomotive gases present. Plain Bessemer rails have a life of about 18 months in the tunnel. Deterioration proceeds in the flaking of a scale from the rail until the edges of the base become quite sharp and removal is necessary. Chrome alloy rails, substituted for the Bessemer rail at the last renewal, have now been in service nearly three years. In addition to the increased length of life resulting from the ability to resist corrosion, the breakages in this latter class of rail have been less than one-fourth of the number for the plain rail, according to M. J. Corrigan, general inspector of tunnels of the Baltimore & Ohio.

The Strauss Bascule Bridge Company, Fort Dearborn Building, Chicago, reports the adoption of its design of bascule bridge by the Department of Railways and Canals, Ottawa, Canada, for a 156-ft. single-leaf, highway bridge over Lachine Canal, near Rockfield, Canada, for which it will receive bids in about six weeks; New York, New Haven & Hartford Railroad, New Haven, Conn., for a 40-ft. single-leaf, double-track railroad bridge over Cohasset Narrows, near Buzzards' Bay, Mass., for which bids will shortly be invited by the railroad company; Port Arthur Pleasure Pier Company, Port Arthur, Texas, for a 104-ft. single-leaf, highway bridge, for which bids will shortly be invited by the company.

The Bridgeport Metal Treating Company, Bridgeport, Conn., whose specialty is the treating of high-speed steel, has found its business showing a steady increase, and since the first of this year has added about 25 per cent. to both its buildings and equipment.

The total population of London is placed by its latest census at 7,252,965, this including 2,730,002 in the outer ring.

The National Bridge Company of Canada

The following description of the plant of the National Bridge Company at Montreal, Canada, erected at a cost of about $1,000,000, is taken from the Contract Record of Toronto:

Power has been turned on and the work in the shops started for this, the newest of the large steel companies in Canada. As first stated to the Contract Record last January, the plant was expected to be complete and in working order about July 1, or just six months from the date that ground was first broken for the main buildings. The machinery is all installed and all parts of the shops are now working full time. Power is supplied by the Shawinigan Falls lines of the Montreal Light, Heat & Power Company. No steam is used except for the heating of the buildings in winter. The staff organism is complete, even to the smallest detail, and a large number of draftsmen are now engaged on contracts for a number of buildings and bridges.

The plant is located directly on the Canadian Northern Railway lines near Dominion Park, in the eastern section of Montreal, and also has access to the St. Lawrence River wharves adjoining the company's property. Very rapid construction has been made, and this is creditable also to Canadian manufactures, as the manager has stated that about 80 per cent. of the machinery has been manufactured in Canada.

The present capacity of the plant is 20,000 tons, which will be increased to 40,000 tons by the erection of No. 2 bridge shop during the coming winter. This will bring the new plant to first or second place in the ranks of the bridge and structural companies in Canada for size and capacity.

The buildings now complete and in use are the main No. 1 structural shop, 137 x 350 ft., and the power house, machine shop, template shop, erection and paint houses, the stock yard crane runway of 80-ft. span and 400-ft. run, and the shipping yard crane runway, 50 ft. x 150 ft.

Among the numerous contracts already booked and going through the shops are the steel work for the Arena Gardens Company's rink, Toronto; the new power house for the Canadian Westinghouse Company, Hamilton; the St. Henry car barns for the Montreal Street Railway Company, the Strachan Building, the Walter Baker Company's Building, extension to Macdonald College at St. Anne's, and the Beauchemin foundry at Sorel.

The plant and mechanical equipment were designed and the construction carried out under the supervision of the general manager of the company, J. L. Brower, who is well known in the steel business. The general contractors for the building were Peter Lyall & Sons, to whom great credit is due for the rapid construction during the severe weather of the winter months.

The National Bridge Company is capitalized at $4,000,000, only a part of which has been issued. The directors are all men of large means and prominent in the financial world, and include J. N. Greenshields, Wm. Lyall, W. G. M. Shepherd, H. W. Beauclerk and Robert Mackay.

The New Jersey Machinery Exchange has engaged in business at 349 Market street, Newark, N. J., with a full line of new and second-hand machinery and appliances, consisting of lathes, shapers, milling machines, screw machines, power drills, foot and screw presses, planers, drop hammers, jewelers' rolls, woodworking machinery, blowers, buffers, grinders, shafting, hangers, pulleys, belting, etc.

The Society of Automobile Engineers, 1451 Broadway, New York, has issued a data sheet giving its standard sizes of lock washers just adopted. This standardization has been accomplished after a great deal of conference and committee meeting. The number of stock sizes has been reduced to 28, as against several hundred in general use. One firm alone has been making as many as 700 different sizes. The sheet referred to also gives suitable tests for determining the temper and toughness of the washers when made.

Two Thomas Meter Installations

Two installations of the Thomas meter which was illustrated in *The Iron Age*, March 16, 1911, have been made by Cutler-Hammer Mfg. Company, Milwaukee, Wis., that are of a diverse character. One is at the West Side plant of the Milwaukee Gas Light Company, where all the gas supplied to that city for heating and lighting passes through a single 30-in. main and is measured by one of these meters, which is an electrical device for measuring the flow of gas, while the other is almost as novel, being located at the Brave, Pa., pumping station of the Peoples Natural Gas Company of Pittsburgh and is used for measuring the natural gas passing between the wells and the pump.

The Milwaukee installation is a very striking example of the flexibility of the location of the parts of the meter and its enormous capacity compared with the space occupied, the maximum capacity being 3,000,000 cu. ft. of free gas per hour and an accurate minimum capacity of 50,000 cu. ft. The use of the Thomas meter was decided on in this case as the enormous quantity of low-pressure gas flowing through the main could not be measured accurately except by the displacement type of meter, and the large number of these units necessary for the work made measurement in that way entirely impracticable. The only available space in the pipe line for the meter casing was a vertical section 5 ft. 10 in. long located directly between two elbows. A special casing occupying no more space in the pipe line than the section of pipe which it replaced was designed, and the inner barrel, containing the heater and the thermometer units, is so constructed as to be removed for cleaning easily.

The recording instruments had to be placed on the pumping station floor where the space was exceedingly limited and for that reason the heater rheostat and the control mechanism were separated from the recording panel and placed in a corner of the basement. The rheostat measures 34 x 42 x 40 in. and the recording panel, which has mounted upon it a recording instrument and the control switches, is only 36 x 44 inches. This panel is located on the wall, where it can be conveniently operated from the floor of the station. In this way it has been possible to install in a plant already built and in operation a meter which will measure the total output of the plant and occupies practically no space that could have been utilized for other purposes.

While the pressure at the Milwaukee installation is approximately constant, at Brave the pressure varies from 50 to 200 lb. gauge and the temperature also varies with the weather conditions, which is not the case in the other installation. The meter at Brave gives a continuous graphical record as well as the integrated value of the flow of gas through the line in which it is installed directly in standard cubic feet at an absolute pressure of 15.025 lb. and a temperature of 60 deg. F., although these conditions vary widely, as stated above. The meter casing is installed in a field just above the ground level directly between two risers from an underground main and close to the fittings and gate valves. The pipe in which the meter is installed is a 10-in. suction line within about 200 ft. of the suction header of the pumping station and wires lead from the meter into the lighting plant of the station which supplies the meter with the energy necessary for its operation. In this case also the recording panel is situated at some distance from the meter, its location being alongside of the lighting switchboard.

An unusual opportunity is afforded by this installation for checking the accuracy of the meter because of the very wide variations in pressure and rate of flow of the gas through the line in the ordinary operation of the system. Brave is approximately 50 miles southwest of Pittsburgh, and Bula, the other terminus of the pipe line, is just across the boundary between the states of Pennsylvania and West Virginia. At the latter point there is a very complete and thoroughly calibrated Pitot tube station, one tube of which is in the same line with the Thomas meter. In this way it is possible to run the two meters in series although they are separated by approximately 1½ miles of 10-in. pipe. Readings of pressure and velocity head are taken on the Pitot tube every 15 min., night and day, and from these readings the value of the gas flow in standard cubic feet is obtained by the use of carefully prepared tables. Since these tables reduce the Pitot tube readings to the same standard units that the Thomas meter is designed to read the results can be easily compared.

After the meter was installed very thorough tests were made under service conditions to determine the degree of accuracy with which it would give continuous results directly in standard cubic feet with variable pressures, temperatures and rates of flow as compared with the results obtained by very frequent and careful observations on the Pitot tube. One of these tests was of 22 hr. duration and during a large part of the time the rate of flow was kept nearly constant and the temperature of the gas remained the same, although the pressure varied from 72 to 123 lb. gauge. After this test the meter was put into continuous service in series with the Pitot tube and ran with but very few interruptions in the gas flow for 45 days. During this time the rate of flow varied from 90,000 to 640,000 cu. ft. per hour, the pressure ranged from 46 to 185 lb. gauge and the temperature from 45 to 65 deg. F. Readings were taken on the Pitot tube as before and results were obtained from the Thomas meter by continuous records and by reading the integrating instrument at 3-hr. intervals. These two tests, one for a comparatively short period of time under quite steady conditions of flow, pressure and temperature, and the other for a longer period under the widely varying conditions, gave results with the two instruments that checked within 0.2 per cent.

Motion Pictures for Selling Machinery

To bring a machine to the buyer's office and to show it in action without the noise and grime of the factory is virtually what is suggested by the Motionscope Company, Indianapolis, Ind. The company manufactures a motion-picture machine of a size fitting into a salesman's traveling case, but in addition to enabling the salesman to enter a prospect's office and give a demonstration of the machine in operation, it is pointed out that films may be shipped to prospective buyers when it may not be necessary to send the entire machine. Then the film can be shown at the regular motion-picture institution of the neighborhood at little cost.

The picture machine is equipped with an attachment for showing single slides, which of course may be colored or may be reproductions of drawings to elucidate features of the design not conveniently explained with the motion picture. Of course, with a motion-picture machine the reels may be stopped at any point and a definite operation studied with care. The possibilities of the application of the motion-picture machine are of course great, and it is interesting to add that the company has had such a degree of success in introducing the machine that on October 1 it expects to have a plant of double present capacity for turning out films, slides and picture machines. It has prepared an illustrated booklet covering at length the argument for the use of the motion picture for machine selling.

Railroad Equipment Orders.—The St. Louis & San Francisco is reported to have ordered 250 flat cars from the American Car & Foundry Company and the Pennsylvania Railroad 700 gondola and 35 flat cars for its lines West from the Pressed Steel Car Company. The Queen & Crescent has been taking prices on 356 cars and the Havana Central has been in the market for 75 all-steel coal cars. Among cars under negotiation are 2000 for the Illinois Central, 1200 for the Wabash, 1000 for the Seaboard Air Line and 1000 for the Monon. The Pennsylvania and Baltimore & Ohio are reported in the market for passenger coaches. The Kansas City & Southern is about to place an order for 29 locomotives and the St. Louis & San Francisco has bought 20 locomotives from the American Locomotive Company.

The indices for each volume of *The Iron Age* are desired from January, 1904, to June 30, 1911. If any of our readers can spare copies of the index for any one of the volumes referred to, the Circulation Department of the David Williams Company, 239 West Thirty-ninth street, New York, would be pleased to be advised.

Fire Protection in Factories *

Some of the Measures Which a Thorough-Going Study Has Developed at One Plant

BY CHARLES E. MEEK.

As an example of the application of intelligence and diligence to fire protection in an individual house you will find interesting a report of one of the leading members of the Credit Men's Association, of his efforts to strengthen conditions at his plant. This man evidently realized that the destruction of a plant cannot be compensated for by insurance, but that the demoralization which follows in the wake of fire brings losses which are irreparable.

He says for many years his concern occupied as co-tenant one-half of a large building located in the "congested district" of his city. The building had been erected as strictly fireproof—as such construction was understood at the time of building. Between the two tenants was a division wall with no openings, so that the hazard of one tenant did not affect that of the other. Care was taken to provide fire shutters for the three exposed sides. Each floor was equipped with extinguishers, barrels, pails, fire-fighting and fire-preventing devices, but it was not a sprinkler risk, and because the owners of the building refused to make it so the concern decided to build a factory for itself.

In doing so the purpose was to provide the best fire risk that the location would permit, for the business could not well be taken from the so-called "congested district." Nothing was spared in the erection of the new building which would help reduce fire hazards. All windows on exposed sides were equipped with wired glass and metal frames. The elevator wells and stairway areas were placed on opposite sides of the building and protected with brick walls, and all openings protected by standard fire doors. The building throughout was equipped with the sprinkler system, each floor having its separate cut-off, so that in the event of leakage it would be necessary only to abandon sprinkler protection on that particular floor, while repairs were progressing. Electric power was used, but the heating plant was installed in the sub-basement, and entirely protected with brick. The owners of the business gave the firm free hand to install other improvements, and our member decided to erect a standpipe equipped with 50 ft. of hose on each floor, carry it to the roof, where a twin coupling of standard size was attached with 100 ft. of standard fire hose, interchangeable with the city equipment, in order that fire in an adjacent building might be fought from the roof. This provision, he says, has already proved wise, fire having been fought in a building across the street by using these twin couplings. The number of extinguishers requested by the Board of Underwriters has been installed, the member making it a rule to co-operate rather than oppose, when suggestions which seem reasonable are made, and the adoption of which would appear to make the risk better.

Not satisfied with the mere installation of the sprinkler system, our member made it his business to familiarize himself with all its mechanical parts and had every man of authority in the plant become equally familiar with it. A chart of the system was prepared for reference and to fix the various devices, valves, etc., firmly in the minds of all concrened. It occurred also to our member that printed tags explaining the purpose and manner of using the valves, cutoffs, draincocks, etc., would facilitate the use of the apparatus when suddenly needed. Therefore a tag explaining the use of each device in connection with the sprinkler system was attached thereto, with printed instructions where necessary. On each floor, over the main aisles and cross aisles, were hung signs pointing in the direction of the sprinkler cutoffs, so that in case of confusion from fire or leakage, there would be no waste of time in finding the main supply valve. Precaution was taken to add outside sprinklers, which, by the way, were not required by the State Board of Underwriters, and our member says he has made it his business to take charge of all tests of these sprinklers, in order to become thoroughly familiar with every device. Another precaution was taken in the shape of inviting the captain and his men from the nearest fire house to inspect the plant and become thoroughly familiar with its interior and particularly with its fire-prevention devices.

Our member ends his description by stating that he made it his business to co-operate with inspectors and with the State Board of Fire Underwriters through their sprinkler committee, and the result was eminently satisfactory on both sides; for after the equipment was complete, a rate of 25 cents on contents and twenty cents on building and fixtures was secured.

Supervisory Alarm System

In connection with the sprinkler system, attention was directed to the matter of watchman service, which was found to be a difficult question until it was decided to install the supervisory alarm system approved by the National Board of Fire Underwriters, connecting the plant with the local office of the American District Telegraph Company, which will know immediately of any flow of water caused either by leakage or fire, the lowering of water in the tank below a certain point, the flow of water into the tank above a certain point, the temperature, whether too low or too high, or tampering with valves anywhere in the building. This was felt to be better than a watchman, who may not be where needed when accident occurs. The supervisory alarm system is required to be inspected and tested weekly, and our member requires that a signed report of each inspection be laid before him. By this system it is not necessary to have valves either locked or strapped open, for it is positively known if they are open, for if one were closed there would be a signal to that effect, so that there cannot be any tampering with the various devices of the system anywhere in the building without knowledge thereof.

Our member says the best result of the pains taken thus far is that there is a feeling of security, which has been purchased at the expenditure of a nominal sum. He says that if business men would but awaken to the value in comfort and dollars of going to the pains his concern has, rates would not only be decreased, but the danger of a business or a city becoming wrecked by fire would cease. Another result to which he calls attention is that he has established so high a grade of insurance risk that he is able to dictate somewhat as to lines of insurance he will accept, the size of his policies and the companies he will insure in.

*Extracts from an address before the convention of the National Fire Protective Association. Mr. Meek was formerly secretary and treasurer and is now a vice-president of the National Association of Credit Men.

Open Hearth Steel Furnaces in Great Britain

The status of the open hearth steel industry in Great Britain is shown in statistics recently collected by the Iron and Coal Trades Review of London. There are 104 firms in Great Britain owning 535 open hearth furnaces, of which number 422 are now being operated. Similar statistics gathered in 1903 showed 94 firms owning 512 furnaces. The number of acid furnaces has fallen off from 417 in 1903 to 407, whereas in the eight years the number of basic furnaces has increased from 95 to 128. The Northeast Coast, Wales and the Midlands are the principal centers of the basic steel industry and the two first named districts have made substantial increases. A number of Talbot furnaces have been built in the Northeast Coast district, with a capacity of 175 to 250 tons. It is found that the total capacity per heat of open hearth steel in the various districts is 16,390 tons. The Northeast Coast district has made the largest advance, or from a capacity of 3650 tons per heat in 1903 to 5300 tons at the present time.

A comparison is made between the total capacity per heat of German open hearth furnaces. In 1909 Germany had 436 furnaces, with a capacity of 8240 tons per heat. It is estimated that the present capacity of the German open hearth furnaces is 10,000 tons against 16,390 tons in Great Britain. The Review says that "taking the production in 1910 of open hearth steel ingots, which was 5,113,758 tons in Germany, and 4,231,569 tons in Great Britain, a very striking contrast is shown in the degree of employment of the available plant."

Employees Demand Control of Harriman Lines Shops

A serious situation has been created in the machine shops of the Harriman Lines in the past week by the demands of the Federation of Shop Employees, representing machinists, boilermakers, car men, blacksmiths and sheet-metal workers employed in these shops. While an advance in wages is asked, the chief demand is recognition of the Federation. Vice-President Kruttschnitt has thus far refused this, but has appointed a meeting for this week at San Francisco with the presidents of the five unions which the federation includes. He issued a statement giving at length the demands of the federation and in each case the reason by officials of the Harriman lines are opposed to granting what is asked. The closed shop is one demand, all employees being required to join the federated association within 30 days. Other demands are that no employee shall work by piece, premium or bonus system; that all grievances of the employees shall be settled through a federated committee so that the workers in all crafts shall be behind the demands made by any one; the abolition of any requirement of physical examination or a statement of personal record by an employee; allowing employees to indicate who shall be laid off when forces are reduced; requiring the consent of the employees' committee before an employee can be discharged or suspended; increases in wages ranging from 15 to 28 per cent., adding about $7,000,000 a year to the pay rolls of the Harriman Lines. Vice-President Kruttschnitt says very positively that the commands cannot be granted, since they involve control of the shops by the employees. For many years the officials of the Harriman Lines have met organized and unorganized employees in conference. In concluding his statement Mr. Kruttschnitt says:

> Under the changes proposed by the federated employees and opposed by the companies, an issue raised on a small road in the system in Louisiana or Texas might stop all shop work throughout the system by requiring members to strike in distant California or Washington or Nebraska. To settle the question, the company involved might have to meet a committee representing all of its craftsmen, which committee would owe allegiance to the General Committee composed of all craftsmen of all lines of the Harriman system. Such an arrangement would mean chaos, would abridge or deprive the corporations of ability to fulfill their duties imposed upon them by the law, and officers deliberately so betraying their trusts would be justly condemned by public opinion.
>
> These are the reasons why we decline to surrender to irresponsible committees of federated employees representing a very small portion of the public trusts confided to us by the entire public, and why we will not concede to such committee the right to dictate whether our companies shall or shall not fulfill for twenty millions of people in seventeen States of the Union the duties clearly prescribed by law.

The employees represented by the unions mentioned above have voted to strike in case the demand for recognition of the federation is not granted.

The Labor Union View of Lifting Magnets

While general statements have been made from time to time as to the saving of labor at iron and steel works and elsewhere by the use of lifting magnets, more specific data are given in an article prepared by a labor union leader for the Social Democratic Herald of Milwaukee. The purpose of the article is to emphasize the displacement of labor by machinery of this character as one of the means of hastening the "day of emancipation for labor," though without any such design on the part of capital. The time of such emancipation, the article intimates, will come "when the workers own the magnet." The writer tells how at the Homestead works of the Carnegie Steel Company two young men, each operating a lifting magnet from the cage of a traveling crane, are now unloading an amount of scrap and pig iron which formerly required 25 men. It is added that the two operators of the cranes and magnets are employed only part of the time on this work while the 25 men displaced were employed all the time. The same article gives a record made in unloading pig iron at the dock of the Inland Steel Company at Indiana Harbor, Ind. In 10½ hours 2000 net tons of pig iron was taken from the vessel by two cranes operating lifting magnets. It is stated that before the introduction of the magnets the services of 28 men working two days and two nights were required to unload an equal tonnage.

Judicial Decisions of Interest to Manufacturers

ABSTRACTED BY A. L. H. STREET

Proof Required of Employee Suing for Personal Injury.—An employee suing for injury caused by being struck by a car running down an incline must show necessity for being so close to the track as to be struck. (Indiana Apellate Court, Livezey vs. Indiana Rolling Mill Company, 94 Northeastern Reporter 732.).

Risk Not Assumed by Machinist.—A machinist did not assume the risk of being injured at a machine used to cut slots in heavy steel frames, through the accidental revolution of a lever, where the lever could have been equipped with a safety device or a wheel could have been substituted. (United States Circuit Court of Appeals, Third Circuit, Deninger vs. American Locomotive Company, 185 Federal Reporter, 22.)

Liability for Injury to Workman Caused by Emery Wheel Breaking.—An employee cannot recover for injury caused by the breaking of an emery wheel on which he was grinding tools, where he selected the wheel and was in as good position as the employer to know whether it was dangerous. (Pennsylvania Supreme Court, Rodell vs. Adams, 80 Atlantic Reporter, 253.)

Liability for Injury Resulting from Defective Appliances.—An employer is liable for injury to a workman resulting from the former's failure reasonably to inspect and keep safe an appliance which the employee must use, unless the workman himself fails to exercise due care. An employee need not inspect closely and make sure of the condition of an appliance, and is chargeable with notice of such defects only as are, or should be, known to him. (West Virginia Supreme Court of Appeals, Denny vs. American Car & Foundry Company, 71 Southeastern Reporter, 706.)

Liability for Injury Caused by Defective Scaffold.—Under the provisions of the New York labor law, requiring an employer to provide safe scaffolding, he cannot avoid liability for injury to a workman by showing that the defects were latent and not discoverable by inspection. (New York Supreme Court, Erie County Trial Term, Smith vs. Variety Iron & Steel Company, 130 New York Supplement, 277.)

Employer's Liability for Employee's Acts During Rest Period.—A steel company's liability for injury to a mill employee is not affected by the fact that the employee, through whose negligence in throwing an electric switch at the wrong time the accident resulted, was off duty when he threw the switch; the work being conducted under a plan whereby the negligent employee worked and rested thirty minutes in alternating periods. (Illinois Supreme Court, Tijan vs. Illinois Steel Company, 95 Northeastern Reporter, 627.)

Liability for Personal Injury Sustained While Unlawfully Working On Sunday.—A workman injured through the negligence of an incompetent fellow employee, the incompetency being unknown to him, can recover his damages on the theory that the employer was negligent in retaining the negligent workman, though at the time of the accident all three persons were engaged together in violating a law prohibiting work on Sunday. (Georgia Supreme Court, Hughes vs. Atlantic Steel Company, 71 Southeastern Reporter, 728.)

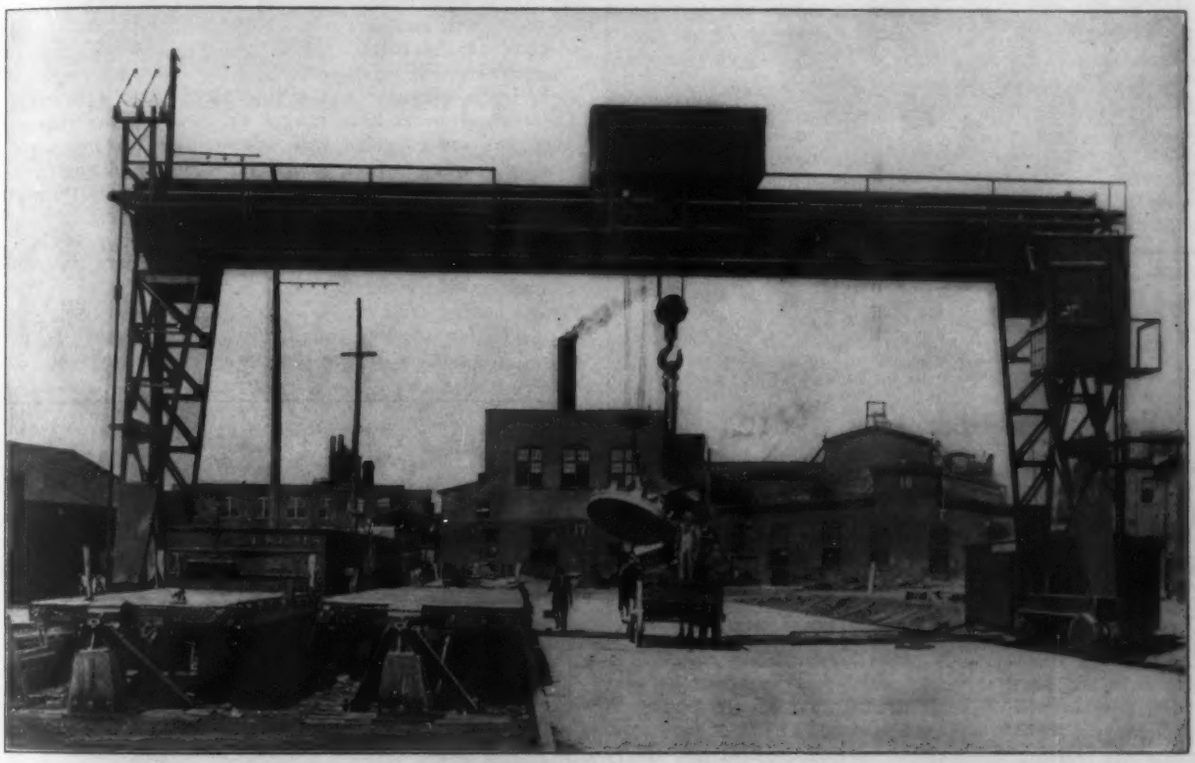
Amount Recoverable for Personal Injury.—The amount of $11,916 is not excessive recovery for personal injury to a robust employee, 30 years old, who earned about $14 a week, where his right arm was amputated, and he suffered great pain for some time after the accident and has probably sustained a permanent shock to his nervous system. (Rhode Island Supreme Court, Chobian vs. Washburn Wire Company, 80 Atlantic Reporter, 394.

Effect of Breach of Warranty as to Capacity of Machinery.—By retaining an elevator for nearly two years, though it failed to possess the capacity required by the contract of sale, the buyer accepted it in his defective condition. He is, however, entitled to a deduction from the contract price to the extent that the value of the elevator is less than it would have been had the contract been complied with. In other words, he is bound to pay what the elevator installed is reasonably worth. (New Jersey Supreme Court, Otis Elevator Company vs. Headley, 80 Atlantic Reporter, 109.)

Handling Freight with a Gantry Crane

Savings Effected by Its Use at Cleveland Lake Shore Yard

A stiff-leg hand crane rated at 15 tons, but capable of handling 20 or 25 ton loads, was formerly employed for handling heavy freight in the Lake Shore & Michigan Southern Railroad yards at Cleveland, Ohio. The radius of the boom was sufficient to allow it to operate over four cars, while for more than that number the assistance of a switch engine was required. The installation required the services of a crane operator and a crew of five assistants and a foreman for loads of more than 15 tons, which called for the use of rollers and crowbars to move the freight in and out of the cars. During periods of heavy traffic considerable time and extra labor were required for handling the large loads.



A Self-Propelled Gantry Crane for Handling Freight in a Railroad Yard Installed by the Cleveland Crane & Engineering Company, Wickliffe, Ohio.

About six months ago the railroad installed a self-propelled gantry crane built by the Cleveland Crane & Engineering Company, Wickliffe, Ohio. The two hoists of this crane, the main one of 30-tons capacity and the auxiliary which is rated at 5 tons, are both said to be capable of sustaining 50-per cent. overloads. The crane spans two sidings at a hight of 30 ft., the clear distance between the supports being 64 ft. These two sidings can accommodate 12 cars, six on each track, and in addition there is a wide space for trucks to drive under the crane near the sidings. Electricity is employed and at the middle of the bridge is a 25-hp. motor. The armature of this motor connects at right angles with the shafts of the two front trucks, there being four two-wheel trucks in all. In this way the power is transmitted from the motor to the wheels for propelling the crane along the track. An inclosed four-wheel trolley is mounted on the bridge and accommodates the two hoisting motors and the motor for the rack on the crane. In the front of the crane is located the operator's cab where the controlling apparatus for the different motors and the brake is located.

As compared with the former method of handling freight the savings are very apparent. Instead of seven men to handle the freight only one, the crane operator, is required, the hoist being attached to the load by the teamster who calls for it. The range of the crane is three times as large as the one which it replaced, the new crane being capable of operating over 12 cars, while the old one could only be used with four. This saves a large amount of time, together with the services of a switch engine and crew. Handling the load with the new crane takes about one-third the time required previously. Thirteen heavy loads have been handled by the gantry crane in 20 min., a feat which would have required 2½ hr. and a crew of six with the old stiff-leg crane.

The average amount of freight handled per day in July, which is one of the four light months, was about 30 tons. The remainder of the year, which is known as the rush season, has more than twice as much freight every day. On a basis of 100 light days with 30-ton loads and 70 tons for the 200 other working days of the year, the yearly tonnage is 17,000 tons. Three hand-operated cranes would be required to do the same amount of work in the same time, so that the gantry crane does away with the services of two extra operators and thus saves about $1,800 a year. Under the old system about 18 overloads a week would have had to be carried by the three hand cranes and each would have necessitated the services of a gang of six men, at 20 cents per hour each and also a foreman at $65 per month. The saving in labor effected by the use of the new crane can safely be figured at $1,200 per year. In addition the new crane does away with much extra engine work and the saving from this source is probably enough to cover the cost of maintenance and repairs. The cost of the electricity for operating the crane is $500 a year, which, when deducted from the savings in the salaries of crane operators and laborers dispensed with, leaves an estimated net saving per year of $2,500.

The Locomobile Company of America, Bridgeport, Conn., furnishes us with a copy of the menu of the sixth annual dinner of the Locomobile Fire Brigade, which took place at the Old Homestead, Savin Rock, August 26. The menu is unique, one of its features being a photographic reproduction of the automobile fire engine used by the brigade.

The Steward & Romaine Mfg. Co., 124 North Sixth street, Philadelphia, Pa., manufacturer of expansion bolts, toggle bolts and kindred articles, has purchased the four-story and basement building, to which it intends to make considerable alterations, as in addition to its old line it has started to manufacture special bolts, screws and studs of all kinds. The company has in press a new catalogue.

Ingersoll Cutter Grinder

A Recently Developed Machine to Grind Milling Cutters at One Setting

About ten years ago the first cutter grinder for sharpening inserted tooth milling cutters was placed on the market by the Ingersoll Milling Machine Company, Rockford, Ill. Since that time improvements have been made

Fig. 1.—Operating Side of a 24-in. Cutter Grinder Built by the Ingersoll Milling Machine Company, Rockford, Ill.

until in the latest machine, which has just been brought out, a number of original features have been embodied to produce a handy, convenient and accurate face mill grinder. Among those are rigidity of construction, ability

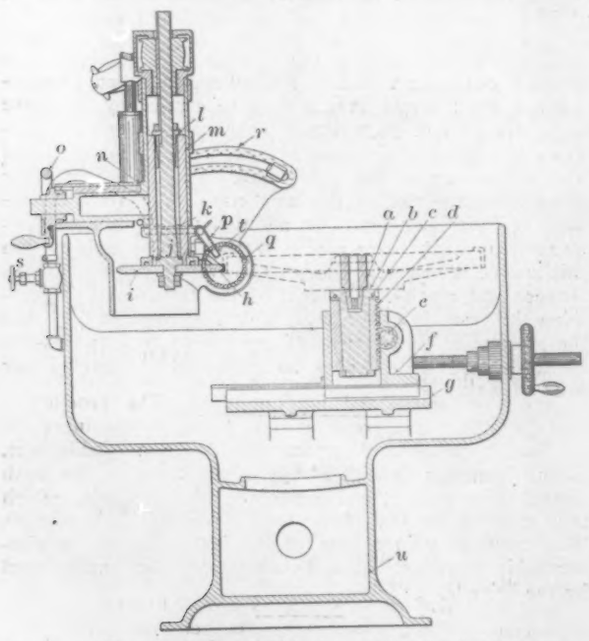


Fig. 2.—Sectional Elevation of the Grinder.

to grind cutters of any shape at one setting and convenience of operation due to a centralized control. Fig. 1 is a general view of the grinder, Fig. 2 gives details of its construction and Figs. 3 and 4 show different types of cutters being sharpened. In the first of these an angular cutter is being ground, and in Fig. 4 the sides of an 18-in. inserted tooth heavy type of face mill are being operated on. Fig. 5 shows the finger gauge which is employed to secure the required amount of clearance when grinding right and left hand cutters.

In designing the grinder an effort has been made to secure the rigid construction so necessary if accurate work is to be turned out, with the result that a machine has been produced to grind either a 24-in. or a 6-in. face mill with equally good results. In addition provision has been made for wet grinding and as there is a large space at the top of the base casting, as shown in Fig. 1, practically all danger of the cutting fluid being thrown by the grinding wheel and spattered on the floor is eliminated. The entire grinding mechanism is supported by a heavy base casting which contains the water tank used for wet grinding work. The saddle carrying the cutter being ground has horizontal and vertical adjustments for regulating the position of the cutters within the capacity of the machine, which will handle milling cutters varying from 4½ to 24 in. in diameter and having faces ⅛ to 4 in. wide. These adjustments have ranges of 10 and 3 in., respectively, and are provided with micrometers for fine work.

The grinding wheel, which is 10 in. in diameter, is carried on a yoke that turns on roller bearings through an arc of 90 deg. from the horizontal to the vertical position, and it is this arrangement that makes it possible to grind cutters without resetting. The corners may be ground round, square or at any desired angle. Three gauges having radii of ⅛, ¼ and ⅜ in., respectively, are furnished for grinding round corners and a fourth is employed for quickly setting the cutter to grind square cor-

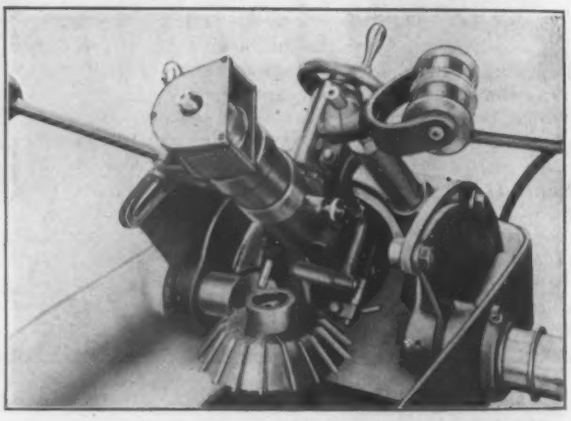


Fig. 3.—Grinding an Angular Cutter.

ners. The first three of these gauges have right-angle sections milled from their ends at these different distances off center. Additional gauges can be furnished for any other desired radius within the capacity of the machine and stops are provided which enable the operator to grind cutters having any angle from 0 to 90 deg. The grinding wheel spindle is 1¾ in. in diameter at the larger end. It is made of high carbon machinery steel and runs in phosphor bronze boxes having a taper cone for taking up wear. The spindle has a 5-in. hand adjustment and also one of 1½ in. to compensate for the wear of the grinding wheel, both graduated to thousandths of an inch in common with all the other adjustments furnished.

Operation of the Machine

In operation the cutter is mounted on an arbor, *a*, Fig. 2, which is carried in the spindle *b*. This spindle revolves in ball bearings *c*, an arrangement which makes it very sensitive and enables the cutter tooth being sharpened to be guided against its directing finger *h*. The quill *d*, which supports the spindle, is adjusted vertically by the pinion *e*, the worm wheel being carried in the saddle *f*. The horizontal adjustment of the saddle is along the slide *g*. Both of these adjustments are graduated in thousandths of an inch and are all that are necessary to place the cutter in the proper position for grinding. The grinding wheel *i* is mounted on a spindle, *j*, which revolves in bronze bushings with a taper cone, *l*, to take up any lost motion that may occur. The spindle car-

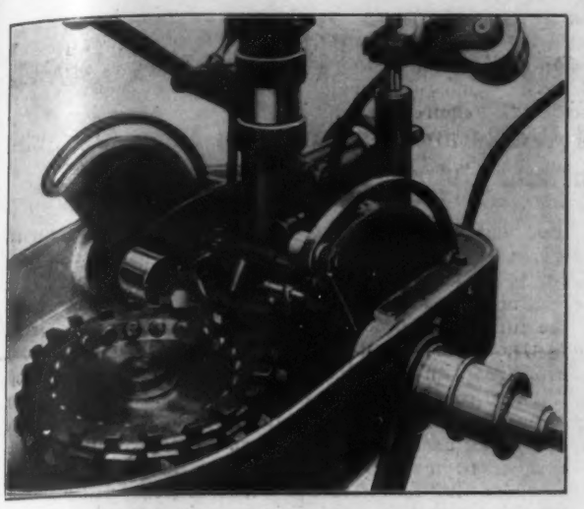


Fig. 4.—Grinding a Heavy Face Mill with Inserted Teeth.

rying sleeve *m*, which has a hand adjustment of 5 in. with a counterweighted lever, is carried in the saddle *n*. A 1½-in. hand adjustment of the saddle is provided by the hand wheel *o*, which is graduated in thousandths of an inch. The saddle in turn is carried in the yoke *p*, which is counterweighted and revolves on roller bearings through an arc of 90 deg. from a horizontal to a vertical position, the exact angle at any intermediate point being indicated on the quadrant *r*. The fluid employed when wet grinding is being done is directed against the cutter through the nozzle *t*, the force being regulated by the valve *s*. From the top of the machine the fluid drains off to the tank *u*, from which it is again pumped through the machcine. All of the controlling attachments and adjustments are within easy reach of the operator's regular position.

When grinding angular cutters the machine is set as shown in Fig. 3, the yoke carrying the grinding wheel being set to the angle of the cutter as indicated on the graduated quadrant. For grinding round corners, for example those having a radius of ¼ in., the rod gauge having the right angle section ¼ in. off center is inserted through the hollow bearing of the yoke. The cutter tooth is set into the milled section of the gauge by its adjustment on the slide and the spindle. When this has been done the gauge is withdrawn and the cutter is ready for grinding. While the grinding is being done the sleeve is automatically locked and the entire yoke swung over each tooth. The yoke can also be set for grinding corners of any angle between 0 and 90 deg., the angular position in degrees being indicated on the quadrant. For grinding square corners the gauge having a zero radius is substituted, but otherwise the operation is the same.

The machine set for grinding the sides of an 18-in. face mill of the heavy type with inserted teeth is illustrated in Fig. 4. A center gauge is furnished with the machine to facilitate setting the fingers for grinding the clearance on right and left hand cutters. This gauge, which is shown in Fig. 5, is inserted through a hollow bearing supporting the yoke and its end lies in a vertical plane passing through the grinding wheel and the cutter supporting spindle centers. The distance from the end of the gauge to the index finger regulates the clearance of the tooth being ground. The following table gives the distance between the center gauge and the finger for different degrees of clearance for the most commonly used sizes of cutters:

Clearance, deg.	Diameter of cutter, in. 6	8	10	12	14	16	18	20	24
	Approximate distance between center gauge and finger, in.								
1	1/16	1/16	5/64	5/64	5/64	3/32	3/32	3/32	7/64
1½	1/16	5/64	5/64	3/32	3/32	3/32	7/64	1/8	1/8
2	5/64	3/32	3/32	7/64	7/64	1/8	1/8	9/64	5/32
2½	3/32	7/64	7/64	1/8	9/64	9/64	5/32	11/64	3/16
3	3/32	7/64	1/8	9/64	5/32	11/64	3/16	7/32	1/4

When the cutter has been set and the finger and the radius gauge adjusted the operation consists of bringing the tooth to the finger stop with one hand and drawing the grinding wheel across the face of the tooth with the other hand, repeating until each tooth is ground. The yoke is then swung to the angle corresponding to that of the side of the tooth and that part finished.

The grinder is regularly arranged for belt drive from an overhead countershaft by a 2¼-in. belt. If desired a 1-hp. motor can be employed instead. The shipping weight of the machine is approximately 1300 lb.

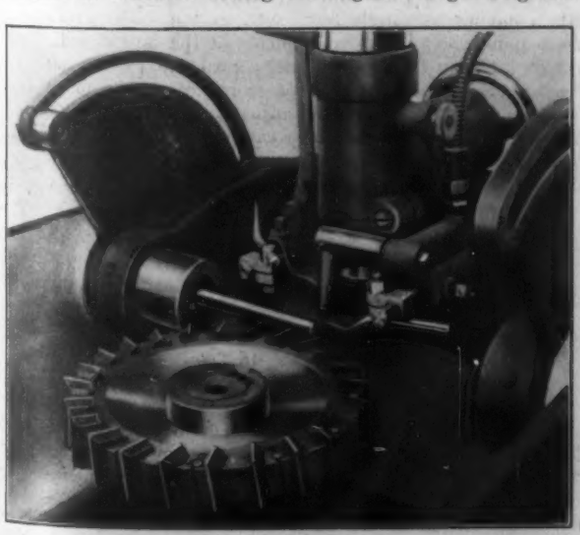


Fig. 5.—Setting the Finger Gauge Employed for Grinding Clearance on Right and Left Hand Cutters.

The Rockford Machine Tool Company's New Plant

The Rockford Machine Tool Company, Rockford, Ill., states that the construction of its new plant is progressing rapidly, and it is expected to be ready for occupancy about October 1. The new buildings are well located on a four-acre tract recently purchased. The plant throughout is of reinforced concrete construction, including all the roofs, and will be practically fireproof. Little or no fire insurance will be carried. The main building is 100 x 200 ft., with 15-ft. ceilings at the sides. A 15-ton traveling crane, with 40-ft. span, will be installed, having a hight of 20 ft. from the hook to the floor. All windows will be fitted with Detroit Fenestra steel sash, which will be set with ¼-in. wire glass. The power house adjoins the main building on the south. It is 48 x 60 ft., including coal storage room. The equipment will consist of two boilers, a Corliss engine and electric generators.

Adjoining the main building on the north are the locker and wash rooms, in which will be installed a system of steel lockers and wash bowls for the convenience of the employees. The blacksmith and pattern shops are also on this side but separated from the main building. They will be constructed of concrete with steel sash, the same as the machine shop. All partitions will be eliminated in the main shop except in the tool and stock room, which will be inclosed by netting. The inclosure will have a complete equipment of steel racks for tools and stock.

The office will be in a separate building in front. It will be constructed of dark pressed brick with concrete roof, the interior finished in oak. There will be a large fireproof vault and storage room for printed matter, etc. The entire plant will be heated in winter by a vacuum steam-heating system, using the exhaust steam during the day. The buildings are being erected by the Frederick A. Little Company, Fond Du Lac, Wis. The products manufactured are shapers, planers and special machinery.

The National Spring & Wire Company, Albion, Mich., which is now operating a branch plant at St. Catharines, Ontario, is erecting a new concrete and steel factory building at Windsor, Ontario, 90 x 140 ft., one story, which will have a cement roof and be as nearly fireproof as it can be made. The equipment will be removed from St. Catharines to Windsor about the last of September. The company is getting out a new line, which will be manufactured in its plant at Albion, but under the name of the National Sanitary Shelf Company. This line will comprise bread racks, pan racks, dump racks and other specialties for the use of bakers.

The Census Bureau's Report on Iron and Steel

Production in 1909 by Blast Furnaces, Steel Works and Wire and Tin Plate Mills, with Values of Plant and Output

A preliminary statement has been issued in the past week by Census Director E. Dana Durand, showing the general results of the Thirteenth Census of establishments engaged in 1909 in the manufacture of iron and steel. Comparative statements are given of the quantity and cost of the principal materials used, and the quantity and value of products manufactured in 1909, 1904 and 1899 in the four classes of works designated as blast furnaces, steel works and rolling mills, wire mills and tin and terne plate mills. The report was prepared under the direction of William M. Steuart, chief statistician for manufactures, by Story B. Ladd.

Statistical Discrepancies

It is stated that the reports were taken for the calendar year 1909, wherever the system of bookkeeping permitted figures for that year to be secured, but in some instances where the business year of the establishment differed from the calendar year the reports relate to the business year falling most largely within the calendar year 1909. This mixing of 12-month periods accounts in large part presumably for the differences between the Census figures for production and those which appear in the statistics of the American Iron and Steel Association. It is unfortunate that the Census Bureau did not adhere strictly to the calendar year 1909. The result of the variations it has permitted is confusion, making comparisons difficult. In practically every case in which we have attempted to compare the Census figures with those of the American Iron and Steel Association the former were less. For example, the pig iron production in 1909, as shown in the Census statistics, was 25,652,000 gross tons, against 25,795,471 tons in the official statistics. The Census figures for steel ingots and castings are 23,523,000 tons, against 23,955,021 tons.

It is explained that the word "establishment" as used in the report may mean more than one mill or plant, provided they are owned or controlled and operated by a person, partnership, corporation or other owner or operator and are located in the same town or city and for which one set of books of account is kept. Separate reports, however, were made for the blast furnace department and the steel furnace and rolling mill department when these were operated in conjunction with one manufacturing unit. In like manner the tin and terne plate dipping department of a plant rolling the black plates has been treated as a separate establishment.

The explanation is necessary that while 1904 was a year of recession in the iron and steel trades 1909 was a year of record output. The difference in the two sets of figures, therefore, cannot be taken to represent an actual expansion of the industry to that extent. Furthermore, 1899 was a prosperous year. It should be said as to capitalization, moreover, that some of the consolidations, particularly the United States Steel Corporation, were formed after the Census of 1899. Their large capitalizations, as now reported for the Census of 1909, are not to be regarded as indicating that appraised value of plant actually increased in the decade to the extent indicated. A summation of the figures given in the preliminary statement is as follows:

The Pig Iron Industry

There were 208 establishments engaged in the manufacture of pig iron in 1909, a decrease of 16 from the number in 1899, but an increase of 17 over that of 1904. The capital reported in 1909 was $487,581,000; in 1904, $236,401,000; and in 1899, $143,329,000; an increase of 106.3 per cent for 1904-1909, and of 64.9 for 1899-1904. The employees, including salaried officials, clerks and wage earners, in 1909 numbered 43,013; in 1904, 37,414; and in 1899, 41,121, an increase of 15 per cent for 1904-1909, and a decrease of 9 per cent for 1899-1904.

The pig iron product in 1909, including ferromanganese, ferrosilicon, spiegeleisen, etc., was 25,652,000 tons, value $387,830,000; in 1904, 16,628,000 tons, value $228,978,000; and in 1899, 14,452,000 tons, value $206,579,000; an increase of 54 per cent in tonnage and 69 per cent in value for 1909 over 1904, and 78 per cent in tonnage and 88 per cent in value for 1909 over 1899. There was charged into the furnaces 50,337,000 tons of ore, mill cinder and scrap, 13,571,000 tons of flux and 29,258,000 tons of fuel in 1909, compared with 26,976,000 tons of ore, mill cinder and scrap, 7,327,000 tons of flux, and 16,697,000 tons of fuel in 1899, showing an increase for the decade of 87 per cent for ore and 75 per cent for fuel. The cost of these materials was $311,043,000 in 1909, $174,493,000 in 1904, and $118,962,000 in 1899, showing an increase for the decade of 162 per cent. On account, however, of differences in method of reporting freight on materials at the several censuses, the statistics in regard to cost of materials are not strictly comparable.

The heavy growth is in coke furnaces, pig iron made with bituminous fuel increasing for the decade from 12,254,000 to 24,609,000 tons, or 101 per cent, and in value from $173,763,000 to $369,684,000, or 113 per cent; whereas the increase in charcoal pig iron is small, and pig iron made with anthracite coal and coke mixed or with anthracite coal alone has decreased largely. The average value of the pig iron made per ton was $15.15 in 1909, compared with $14.29 in 1899.

Of the 1909 product, 15,858,000 tons, or 62 per cent, was produced for consumption in the works of the producer, against 9,926,000 tons in 1904, no figures being given for 1899. Of the 1909 amount 12,198,000 tons, or 77 per cent, was delivered in a molten condition, compared with 5,899,000 tons, or 59 per cent, in 1904.

The active establishments reported 388 completed furnaces with a daily capacity of 101,267 tons in 1909, compared with 343 completed furnaces with a capacity of 78,180 tons in 1904, and 343 with a capacity of 54,425 tons in 1899, an increase for the decade of 13 per cent in number and 86 per cent in capacity.

Steel Works and Rolling Mills

There were 446 establishments in 1909 equipped for the manufacture of steel or for the hot rolling of iron or steel, compared with 415 establishments in 1904 and 445 in 1899. The capital reported in 1909 was $1,004,735,000; in 1904, $700,182,000; and in 1899, $430,232,000; an increase of 43.5 per cent for 1904-1909, and of 62.7 for 1899-1904. The employees, including salaried officials, clerks and wage earners, in 1909 numbered 260,123; in 1904, 221,892; and in 1899, 190,703; an increase of 17.2 per cent for 1904-1909, and of 16.4 per cent for 1899-1904. The products of these establishments amounted in value to $985,723,000 in 1909, $673,965,000 in 1904, and $597,212,000 in 1899, an increase in value of 46 per cent for the period 1904-1909, and 65 per cent for the decade.

The principal materials used amounted in value to $529,952,000 in 1909, compared with $364,475,000 in 1904, and $322,269,000 in 1899, an increase for the decade of 64 per cent. The chief item is pig iron, of which there was consumed 19,077,000 tons, costing $297,471,000, in 1909, compared with 12,191,000 tons, costing $172,102,000, in 1904, and 10,410,000 tons, costing $151,042,000 in 1899. The above figure for the 1909 consumption of pig iron includes 365,000 tons of spiegeleisen, ferromanganese, ferrosilicon and other ferroalloys, costing $14,807,000; the ferroalloys consumed in 1904 and 1899 being included under "pig iron" but not reported separately.

The rolled, forged and other classified iron and steel products in 1909 aggregated 26,639,000 tons, compared with 18,217,000 tons in 1904, and 15,056,000 tons in 1899, an increase for the decade of 77 per cent; the value of the same for the several years being as follows: 1909, $861,165,000; 1904, $585,288,000; and 1899, $510,906,000; an increase for the decade of 69 per cent.

There has been very heavy growth in certain of the rolling mill products, notably in wire rods, the output of which increased from 917,000 tons in 1899 to 2,295,000 tons in 1909, or 150 per cent; structural steel, from 857,000 tons

in 1899 to 2,124,000 tons in 1909, or 148 per cent; and plates and sheets, not including black plates or sheets for tinning, from 1,488,000 tons in 1899 to 3,333,000 tons in 1909, or 124 per cent.

Steel Production

The total production of steel ingots and castings, including that of 24 establishments equipped for the manufacture of steel, but engaged primarily in the manufacture of other products, was 23,523,000 tons with a value of $482,947,000 in 1909, compared with 13,671,000 tons and a value of $261,232,000 in 1904, and 10,685,000 tons and a value of $212,539,000 in 1899; an increase for the decade of 120 per cent in tonnage and 127 per cent in value. In 1899 Bessemer steel formed 70 per cent of the steel production, and although it still exceeded in quantity all other steels in 1904, yet it only constituted 57 per cent of the total; during the decade ending with 1909 the production increased 22 per cent. In 1909 the production of open-hearth steel was 14,212,000 tons and formed 60 per cent of the steel production. The heavy growth has been in basic open-hearth steel, which increased from 2,154,000 tons in 1899 to 13,221,000 tons in 1909, an increase for the decade of 514 per cent. During the same period acid open-hearth steel increased 11 per cent, and crucible and miscellaneous steels 6 per cent. The steel production includes, for 1909, 549,000 tons of direct castings of a value of $42,607,000; for 1904, 292,000 tons, valued at $20,947,000; and for 1899, 177,000 tons, valued at $14,610,000, the balance being ingots.

Of the 1909 product, 523,000 tons of open-hearth steel was partly purified in Bessemer converters before finishing in open-hearth furnaces.

The daily capacity of rolled iron and steel on double turn of the rolling-mill establishments was 150,000 tons in 1909, 106,000 tons in 1904, and 87,000 tons in 1899, an increase for the decade of 73 per cent.

The Wire Industry

The total value of the products of the wire industry was $167,709,000 in 1909, about equally divided in value between mills drawing wire from purchased wire rods and the wire departments of rolling mills, which roll wire rods, viz., $84,486,000 and $83,223,000, respectively. Figures available for 1904 and 1899 are not fully comparable. Not including establishments drawing wire from purchased rods and making entire product into nails or other wire fabrications, the value of products was $112,719,000 in 1904 and $57,150,000 in 1899, the latter figure, however, not including the copper, brass and other metal-wire products of the wire departments of iron and steel rolling mills, which was not relatively a large item.

The capital reported in 1909 was $60,157,000; in 1904, $14,899,000; and in 1899, $4,242,000; an increase of 303.8 per cent for 1904-1909, and of 251.2 for 1899-1904. The employees, including salaried officials, clerks and wage earners, in 1909 numbered 19,931; in 1904, 5318; and in 1899, 1697; an increase of 274.8 per cent for 1904-1909, and of 213.4 per cent for 1899-1904.

There was consumed by the wire mills of the country 2,646,000 net tons of wire rods in 1909, costing $101,620,000, distributed according to metal, as follows: Steel, 2,515,000 tons, costing $67,440,000; iron, 4000 tons, $183,000; copper, 126,000 tons, $33,733,000; and other metal, chiefly brass, a little less than 1000 tons, $264,000. Of this material, 955,000 tons was used in wire mills that purchased the wire rods and 1,691,000 tons by the wire departments of rolling mills. There was also used by the wire mills 58,000 tons of purchased wire.

The wire industry in 1909 includes wire and products of wire to the value of $161,049,000, and other products to the value of $6,660,000. There were drawn, in the aggregate, 2,514,000 tons of wire, of which iron and steel constituted 2,389,000 tons; copper, 124,000 tons; and brass, bronze, white metal, etc., 900 tons, the latter being chiefly brass. The iron and steel wire products amounted in value to $120,533,000, of which $72,599,000 was the product of the wire departments of rolling mills and $47,934,000 was produced by wire mills which did not operate wire rod trains. The copper product was of the value of $40,032,000, of which $30,832,000 was by mills purchasing wire rods, and $9,200,000 was the product of the wire departments of rolling mills. Wire products of brass, bronze, white metal, etc., amounted in value to $484,000. The equipment of the establishments, 1909, comprises 42,799 wire-drawing blocks, of which 21,081 were reported in kind (rod, 4265; redrawing, 7043; and fine wire, 9773) and 21,718 with kind not reported, with a total annual capacity of 3,146,000 tons; 4428 wire-nail machines with an annual capacity of 18,757,000 kegs, and 446 woven-wire fence machines with an annual capacity of 481,000 tons of fencing.

Tin and Terne Plates

There were 31 establishments reporting the dipping of tin and terne plates in 1909, compared with 36 in 1904 and 57 in 1899; of these, 5 in 1909, 9 in 1904, and 22 in 1899 purchased their black plates, the balance rolling them. The capital reported in 1909 was $10,995,000; in 1904, $10,813,000; and in 1899, $6,650,000; an increase of 1.7 per cent for 1904-1909, and of 62.6 for 1899-1904. The employees, including salaried officials, clerks and wage earners, in 1909 numbered 5845; in 1904, 5131; and in 1899, 4004; an increase of 13.9 per cent for 1904-1909, and of 28.1 per cent for 1899-1904. There was used as material in 1909 black plates and metal for coating with a cost of $38,651,000, compared with $30,068,000 in 1904 and $25,596,000 in 1899, an increase for the decade of 51 per cent. This material included 1,321,072,000 pounds of black plates or sheets with a cost of $28,981,000 in 1909, 1,019,609,000 pounds with a cost of $22,992,000 in 1904, and 827,916,000 pounds, costing $20,669,000 in 1899, an increase for the decade of 60 per cent in quantity and 40 per cent in value. There was used in coating 31,078,000 pounds of tin, costing $9,236,000, in 1909, compared with 20,283,000 pounds, costing $4,528,000, in 1899, and 9,850,000 pounds of lead, costing $434,000, in 1909, compared with 6,871,000 pounds, costing $399,000, in 1899. These figures include the tin and lead contents of terne mixture purchased as such, of which, in 1909, there was purchased 9,633,000 pounds, at a cost of $1,062,000. In addition to the foregoing there was consumed 8,032,000 pounds of black plates and 388,000 pounds of coating metal by 3 establishments engaged primarily in the manufacture of other products.

The value of the products of the tin and terne dipping plants in 1909 was $47,970,000; in 1904, $35,283,000; and in 1899, $31,892,000; an increase for the decade of 50 per cent. In addition there was manufactured for consumption and sale by three establishments engaged primarily in the manufacture of other products, tin plate, terne plate and other sheet iron or sheet steel tinned or terne-plated products of a value of $399,000.

American and German Steel Displaces Welsh Workers

The workmen in the plant of the Ebbw Vale Steel, Iron & Coal Company, Ltd., Ebbw Vale, Wales, have asked the British Board of Trade and the Chancellor of the Exchequer to inquire into the shutting down of that company's steel works two months ago. About 4000 men are affected. The company gave as a reason for closing down the fact that last year 160,000 tons of steel, chiefly semi-finished, was imported at Newport, Wales, with indications that this amount would be exceeded this year. The managing director of the company, F. Mills, said to a deputation of the workmen that it was impossible for the company to compete in sheet bars and billets against German and American producers, the foreign manufacturers underselling the Ebbw Vale company by at least 5 shillings per ton. He added that it was impossible in spite of modernizing the equipment to secure sufficient orders to keep the plant going at anything like full time. The company says that it will give the Board of Trade full access to its books and all data. The workmen are not satisfied with the explanation given and hope that the official inquiry will result in the restarting of the works. It was stated when the plant was shut down two months ago that it would probably be idle for three months during which improvements would be made.

According to statistics gathered by the British Iron Trade Association, the production of Bessemer and open-hearth steel castings in Great Britain in 1910 amounted to 66,492 gross tons, of which 34,649 tons was Bessemer and 31,843 tons open-hearth steel; against 34,819 tons of Bessemer and 52,542 tons of open-hearth castings in 1909.

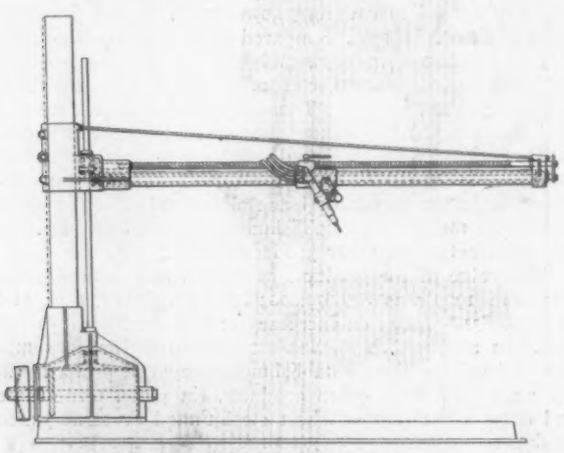
Welding and Cutting Machine

Interesting Development of Acetylene Blow Pipe Working

BY J. F. SPRINGER

Hand welding and hand cutting are now familiar operations to which the acetylene blow-pipe is highly adapted. Where straight-line operations have to be carried out, especially in connection with repetition work, a machine is often applicable and advisable. Where sheets are very thin, machine welding is very desirable because of the certainty with which it can be regulated. The machine can be advantageously used in sheet metal work, where the thicknesses range up to, say, 3/16 or 7/32 in. Straight cutting of both thin and thick work can be advantageously done with the machine because of the precision of the movement.

An acetylene welding and cutting machine has recently been built by the Davis-Bournonville Company, 90 West street, New York City, at its laboratory at Marion Station, Jersey City. The patent rights involved are held by this concern. There is a cylindrical upright perhaps 6 or 7 ft. in height. This carries a long, hollow arm, projecting 6 or 7 ft. on one side. By means of a rack and pinion, this arm may be adjusted to any height desired.

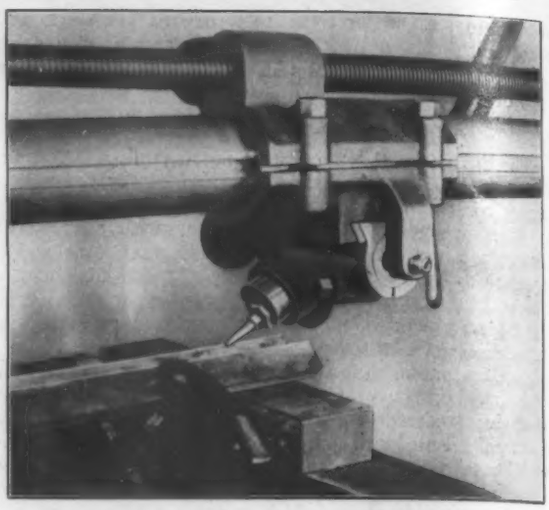


The Machine Rigged with Welding Torch.

The arm carries a long screw, rotatable and mounted horizontally in suitable bearings. Loose and tight pulleys are mounted at the base of the upright on a short horizontal shaft and are driven from an ordinary countershaft above. This latter shaft and a rotatable rod arranged in the hollow arm are put into driving connection by bevel gears. At the outer end of the arm, an arrangement of gears enables the inclosed rod to drive the screw. The turning of this screw operates a carriage back and forth horizontally along the arm. On the carriage, the torch and its controlling fixtures are mounted.

The work is placed or secured on a suitable fixed table. Flexible tubes bring the oxygen and acetylene to the torch. The tip is practically the ordinary form. It is arranged at an angle, say 40 or 45 deg., to the horizontal, this angle being to the rear of the welding movement. The torch then moves over the work much after the way a cowcatcher passes over a railway track.

The method of welding is often quite simple. Thus, if the weld is to be a flat one and of inconsiderable length, the two pieces are simply clamped in the exact relative positions they are to occupy finally. Room must, of course, be left for the tip to pass. The carriage with the torch moves evenly along at the proper rate of speed. The countershaft, running at say 140 r.p.m., operates the short horizontal shaft at about 70 r.p.m. It is possible to adjust the friction pinion to vary the angular speed of the vertical shaft from about 70 to about 35 revolutions. Still further reductions of speed may be made by the gears at the end of the arm. Indeed, quite a range of speeds may be obtained by suitable combinations of the gears. The screw has about 6 threads to the inch, and gives the carriage a speed which may be varied from 3 to 24 in. per minute. The carriage has a back-and-forth range of 5 ft.



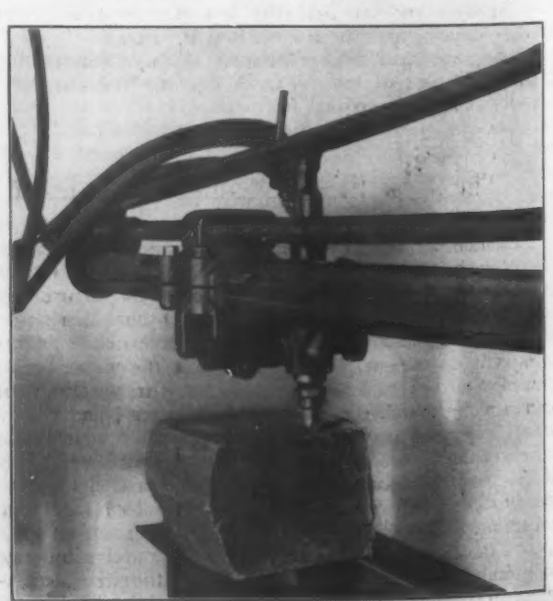
Angular Work in Welding Position.

5 in., which means that a weld of approximately that length may be made. If an angular weld is to be formed, the only difference to be made is in the arrangement of the work.

Because of the enormous temperature of about 6000 deg. F., which is claimed for the working point of the little inner flame of the oxy-acetylene torch, the torch is very successful in bringing steel and other metals locally to or near the melting point. It is not necessary to do all the heating with gases like acetylene and oxygen. The consumption of the gases and time also may be saved. For example, certain work requiring a long seam and involving sheets 0.10 to 0.12 in. thick, can be welded on a European machine at the rate of about 12 in. per minute. Practical experiments where the work was pre-heated before passing under the torch showed, so it is said, that the work con be welded at a speed of 26 to 28 in. per minute.

The methods of pre-heating may be various. Thus, if it is a question of small repetition work, the pre-heating may in some cases be done subsequent to clamping, but prior to putting the work on the table. Other cases will require pre-heating with the work in welding position. In general, the pre-heating arrangements will not be difficult to provide. Pre-heating is to be recommended strongly for the two reasons — economy of oxygen consumption and reduction of effects of expansion and contraction.

The machine already described as a welding device may readily be used as a cutting apparatus. The high precision of the motion of the carriage recommends it for this purpose. In cutting, however, some variations are made. In the first place, the jet arrangements are different. But this is perhaps more a matter of simultaneous



Ready for a Heavy Cutting Operation.

development, as the new arrangement of jets will no doubt be effective as a hand tool. On the machine, three jets are arranged in a rigidly vertical position, the gases being driven directly downward. These are arranged in line with the direction of movement. Ahead is a heating jet of oxygen and acetylene; at the rear is another but smaller heating jet. Between the two, the cutting jet of oxygen is arranged. Three flexible tubes bring the gases. An oxygen and an acetylene tube together supply the gases for the two heating jets. Thus these jets are both supplied from the same sources. An independent oxygen supply is provided for the cutting jet, for the reason that ordinarily the pressure back of this jet is higher — and sometimes much higher — than is the case with the heating oxygen. It has been found that by providing an auxiliary heater behind, the work of cutting is facilitated. Its operation is probably as follows: The forward jet provides heat for the metal which is probably somewhat lost by the time the pure oxygen jet comes along. This jet may be only 3/8-in. behind. Still it would seem that conduction would carry off considerable heat while the cutting jet is getting to the spot, especially where the movement is a slow one, as with very thick steel. The rear jet provided additional heat and thus reduces dissipation by conduction. Its scene of operation is in the region where much of the wasteful conduction would take place. In the case of thin plates, the rear jet is scarcely necessary and may be shut off.

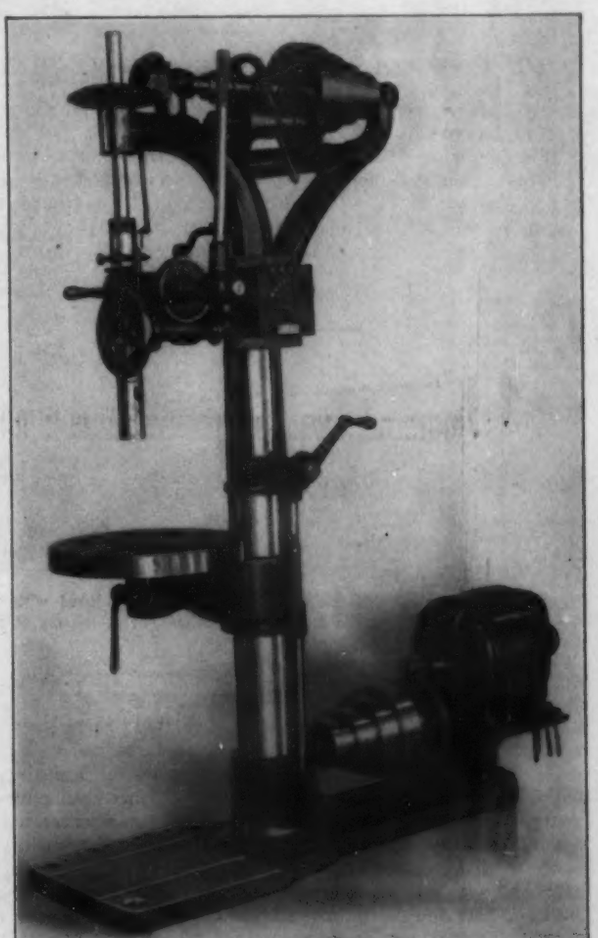
The Joliet Rolling Mill Company, Joliet, Ill., is now installing a large amount of new equipment recently purchased. Part of this equipment consists of an 8-in. mill complete, a large shear for cutting 6-in. square cold steel and four large busheling shears. It is also rebuilding its 22-in. mill so as to make all sizes up to 6 in. rounds and 12 in flats, and is erecting a large lathe for turning the rolls. It is further fitting up a complete machine shop. The company will then have one of the most complete bar-iron mills in the country, with a capacity of 175 to 200 tons per day, and will make all sizes, including rounds and squares, from 1/4 in. to 6 in., and flats up to 12 in. wide, of all thicknesses. The company has experienced a decided improvement in the condition of business. A month ago shipments were being made within 48 hours after the receipt of orders, but the large amount of work recently received has made it necessary to ask for ten days or two weeks time on deliveries.

The list of active blast furnaces producing coke pig iron in Alabama this week showed a total of 18, or a net increase of 1 since August 1. The Tennessee Company has 6 furnaces in blast, the Republic Iron & Steel Company 3, the Sloss-Sheffield Steel & Iron Company 3, the Woodward Iron Company 2, the Birmingham Coal & Iron Company 1, the Alabama Consolidated Coal & Iron Company 2 and the Anniston Iron Corporation 1. Thirteen furnaces are running on foundry iron and 5 on basic —Alice and 4 Ensley furnaces of the Tennessee company. There are 28 furnaces idle in Alabama, fit and unfit, chiefly the latter.

The New Sibley Motor-Driven Drills

Simplicity which characterizes the entire line of drilling machines built by the Sibley Machine Tool Company, South Bend, Ind., is the most noteworthy feature of two new motor-driven drill presses which this company has recently brought out. The driving motor is mounted directly on the base of the tool and the power is transmitted through a train of gears, an arrangement which brings the weight down as low as possible and adds very much to the stability of the tool. The solid, compact design and the ample proportions of all working parts which were features of the 24-in. stationary head drilling machine which was illustrated in *The Iron Age*, May 4, 1911, are also present in these new tools. Two sizes of drill press are built which are known as the 20 and 22½ in. drills, respectively, the former being the one illustrated.

The spindle is driven by a 2¼-in. belt which transmits its power through back gears having a ratio of approximately 4 to 1 and driving gears in the proportion of 2 to 1. The drive for the feed worm gear is through a steel worm running in an oil bath, which insures constant and thorough lubrication. The feed lever is light enough for sensitive quick drilling and at the same time possesses sufficient power for handling heavy work. Lever and wheel feeds, both of which are independent of each other, are provided and the change is made by a slight twist of the lever. The feed mechanism can be entirely disengaged as often as desired as it swings on a hinge pin. An adjustable automatic stop collar on the spindle sleeve trips a latch which releases the lever controlling the operation of the feed gears. This lever also provides a means for taking up any wear occurring in the worm or the worm gear. The vertical shaft is driven by a worm gear and a worm running in oil, the latter deriving its power from the top of the shaft through cone pulleys. There is practically no spring between the head and the table arm as both of these parts are designed to handle much heavier work than the capacity of the tool.



A 20-in. Drill with New Motor Drive Built by the Sibley Machine Tool Company, South Bend, Ind.

The following table gives the principal dimensions and specifications of the two sizes of drills:

	20	22½
Overall hight, in.	72	79
Morse taper of spindle	No. 3	No. 4
Feed of spindle, in.	8	9½
Maximum distance between spindle and base, in.	41½	44
Maximum distance between spindle and table, in.	24	23
Diameter of table, in.	16½	19
Diameter of spindle, in.	1¾	1 7/16
Diameter of column, in.	5¼	6¼
Ratio of bevel gears	23 to 45	25 to 45
Diameter of driving pulley, in.	9¼	10
Face width of driving pulley, in.	3	3
Speed of driving pulley, r.p.m.	300	300
Diameter of largest cone pulley step, in.	8½	10
Diameter of smallest cone pulley step, in.	4½	4
Floor space required, in.	17 x 45	18 x 48
Shipping weight, lb.	650	900
Boxed weight, lb.	900	1,150
Content of case, cu. ft.	37	48

These machines can be supplied either with or without back gears or power feed, geared or belted motor drive, reversing countershaft, or geared tapping attachment.

Lathe Relieving Attachment

Part of the Equipment of the Bradford 16-in. Lathe

As a part of the regular equipment of its line of lathes, the Bradford Machine Tool Company, Cincinnati, Ohio, is furnishing a lathe relieving attachment for straight or tapered work of any number of flutes from 2 to 24 inclusive. This attachment is used in conjunction with the maker's standard taper attachment and the combination is especially recommended for use on taps, hobs, end mills, etc. The special advantages of this attachment are the avoiding of abnormal gear ratios or a multiplicity of gear centers to provide the required number of movements per revolution of the spindle, ability to adjust the relief throughout the entire available range without stopping the lathe and freedom from interference with the traverse of the lathe carriage or the movements of the compound rest when the attachment is in use. Fig. 1 illustrates the attachment applied to one of the maker's 16-in. quick change gear lathes, while Fig. 2 shows the index plate furnished with the attachment to give the change gear combinations necessary for the different amount of relief.

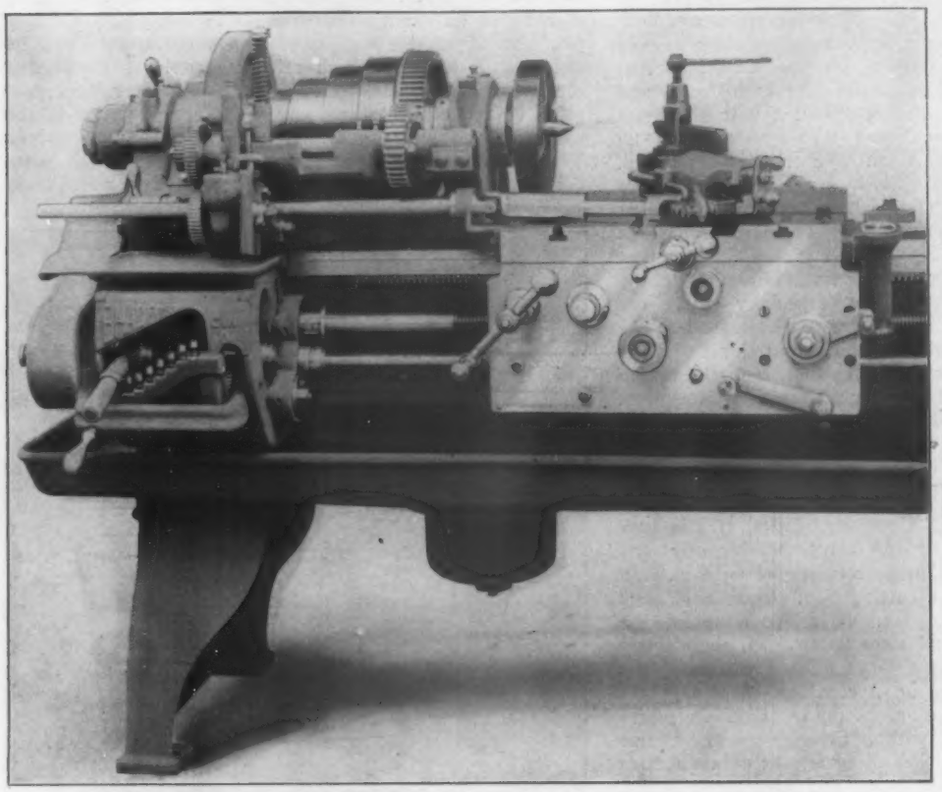


Fig. 1.—A 16-in. x 6-ft. Quick Change Gear Lathe Equipped with the New Relieving Attachment Made by the Bradford Machine Tool Company, Cincinnati, Ohio.

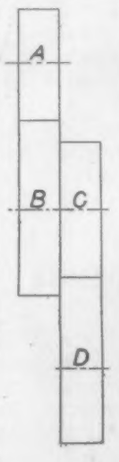
All the parts of the attachment are self-contained in a strong bracket, which is built as a unit and is calculated to insure permanent alignment and correct action for the different parts. This bracket is mounted on the headstock, as shown in Fig. 1, and this position was chosen as being convenient. The attachment is not only easily accessible and in plain view of the operator, but it is not necessary for him to go to the rear of the lathe in making adjustments or in removing and replacing change gears. A spur gear meshing with the face gear drives the attachment and this construction possesses the advantage that the speed of the attachment is varied in the same degree as the work. The required number of movements varies from 2 to 24 per revolution of the spindle. Using the face gear as the driver also insures more accurate work, it is emphasized, than would be possible if the spindle gear or the lead screw change gears were employed, as the strain imposed upon the relieving attachment by the work is so severe that if the change gears were used, the spindle would revolve while the screw remained stationary until the lost motion or spring of the parts was taken up. As the face gear is keyed to the spindle, the relieving attachment stops revolving if one part stops and the screw is thus entirely independent of the relieving attachment.

With this attachment only a single fixed cam is required and this is mounted on a large diameter shaft close to the bearings, an arrangement which insures the rigidity required in a device of this character. The cam is shaped to secure a uniform movement of the tool into the work, while it is quickly withdrawn by a strong spring in front of the headstock at the right of the gear. The tension of this spring can be adjusted by a nut and a washer.

The connection between the connecting rod and the rock shaft facilitates an easy longitudinal movement of the latter even though taps of coarse pitch are being used and heavy cuts are being taken. This arrangement consists of a slotted crank that is integral with an inner sleeve and is driven by an outer bush. The slotted crank is not restrained from a sidewise movement so that the inner sleeve driving the rock shaft by a key has an automatic limited longitudinal movement with reference to the shaft independent of the driving connection. A strong spring returns the inner sleeve to its original position after each cut is taken, and this construction is said to overcome binding or sticking of the rock shaft.

In securing any desired amount of relief with the attachment, the derived motion of the roller bearing against the cam is transmitted

Relieving Attachment Change Gears



No. of Divisions	A	B	C	D
2	24	48	32	48
3	"	"	32	32
4	"	"	40	30
5	"	"	40	24
6	48	24	24	48
7	"	"	28	48
8	"	"	32	48
9	"	"	24	32
10	"	"	40	48
11	"	"	44	48
12	"	"	32	32
13	"	"	26	24
14	"	"	28	24
15	"	"	40	32
16	"	"	32	24
17	"	"	34	24
18	"	"	48	32
19	"	"	38	24
20	"	"	40	24
21	"	"	42	24
22	"	"	44	24
23	"	"	46	24
24	"	"	48	24

Fig. 2.—The Index Plate Furnished with the Attachment Showing the Change Gear Combinations.

through the rocking lever and the connecting rod to the rock shaft, which in turn transmits the movement to the compound rest. At one end the connecting rod is attached to a sliding adjustable block which moves toward and away from the center of the rocking lever and controls the amount of motion transmitted to the rock shaft. This adjustment is regulated by a screw and knurled knob placed within easy reach of the operator so that the amount of relief can be precisely and quickly adjusted within the range of the attachment without stopping the lathe. One end of the rock shaft is carried in a bracket on the carriage, the movement of this shaft being transmitted through a telescopic sleeve and shaft and the knuckle joints to a set of spur gears in the compound rest. An eccentric hub on one side of these spur gears engages the bronze nut in the compound rest through which the top slide screw passes and transmits a rocking motion to the slide. To give the necessary variation in the number of movements per revolution of the spindle a set of change gears and an index plate, Fig. 2, which is simply and easily read are furnished.

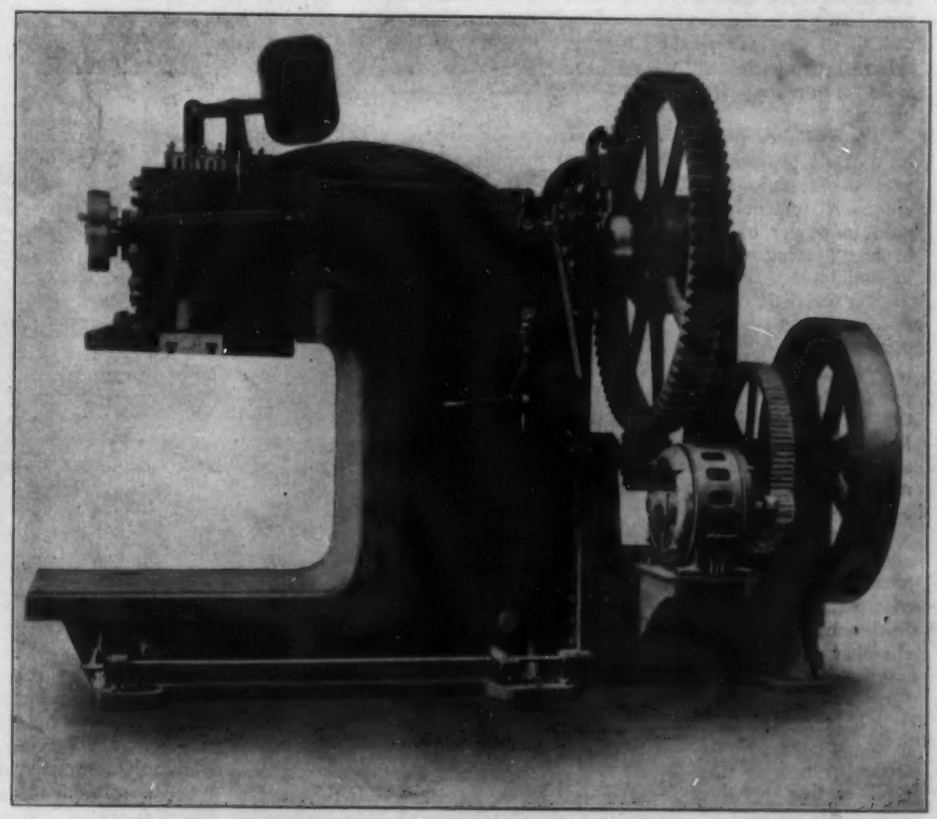
The gear which meshes into the face gear is adjustably fastened to a graduated flange that in turn is held on the shaft by a key and a set screw. In this way it is possible to secure an adjustment between the tool and the work to within 0.001 in. without disconnecting. The carriage of the lathe has full traverse between centers and the movements of the compound rest are always available. When doing ordinary work it is not necessary for the attachment to be removed, since simply locking the small quadrant of the attachment either up or down either disengages or engages it, or slides the driving gear off the shaft. This is not recommended, however, where the lathe is to be used for a considerable length of time for doing regular work, the preferred arrangement being to replace the attachment rest with the regular compound rest at that time. Exposed gears are covered by guards which can be readily removed when necessary.

The United States Geological Survey has published statistics on the recovery of copper, lead, zinc, tin and antimony from scrap metal, sweepings, drosses, etc. This class of metal is called "secondary" to distinguish it from the metal derived from ore, which is known as "primary" metal. The total value of the metal thus recovered in the United States in 1910 is estimated at $45,525,500 against $23,239,610 in 1909. The quantity of copper recovered was 51,000 net tons; brass, 62,000 tons; lead, 55,323 tons; spelter or zinc, including alloys other than brass, 43,932 tons; tin and tin in alloys, 13,903 tons; antimony, 2779 tons.

The Imperial Belting Company, 166-168 West Kinzie street, Chicago, has perfected a belt, in its Sahara brand, which has proved very effective when used for elevating or conveying hot sand or similar material. Some of these belts were placed in service carrying hot sand and other hot material about two years ago, and their present condition shows that the requirements for handling hot material have been satisfactorily met. This is claimed to be a distinct achievement.

New Queen City Punch

A very interesting punch has recently been completed by the Queen City Punch & Shear Company, Cincinnati, Ohio. Aside from the fact that this punch is said to be the first machine ever constructed which is solely adapted for punching and coping Bethlehem I-beams and H-sections, the frame casting is made of a mixture of machinery steel scrap and Northern and Southern iron. The machine was especially designed for the Nolke-Richards Iron Works, Indianapolis, Ind., and was sold by the builder's agent, the Cincinnati Iron & Steel Company.



Machine for Punching and Coping Bethlehem I-Beams and H-Sections Built by the Queen City Punch & Shear Company, Cincinnati, Ohio.

The machine will punch at one stroke six 1-in. holes through a 1-in. plate. The throat is 62 in. deep and 50 in. wide and has a 25-in. trough housing. Like the punch recently completed for the Quinlan Boiler Company, which was illustrated in *The Iron Age*, June 29, 1911, the clutch is of the manufacturer's patented cast steel, safety stop type. This clutch is engaged and disengaged automatically and is so designed as to provide safety for the operator while the punches and the dies are being adjusted without having the belt thrown off as is commonly the case. A foot treadle which acts through cams and a spring plunger to force the clutch into engagement with the driving gear is used, while, if desired, the clutch can be entirely disengaged by the small hand lever on the top of the frame .

The frame casting weighs over 63,000 lb. and was poured by the Bollman-Wilson Foundry Company, Cincinnati, Ohio. The mixture used was approximately 30 per cent. machinery steel scrap and Southern and Northern No. 2 foundry pig iron in equal proportions. It is claimed that in a piece of this size a stronger and clearing casting can be made by using a mixture in proportions given above instead of using pig iron only.

The American Emery Wheel Works, Providence, R. I., reports that its business, both foreign and domestic, has been extremely good for the past year, its foreign business having been particularly heavy. The company now has agencies in practically all foreign trade centers. It is running its plant full time, and its pay roll for the third week in August was the largest in its 15 years of business.

New Cleveland Four-Piston Air Drills

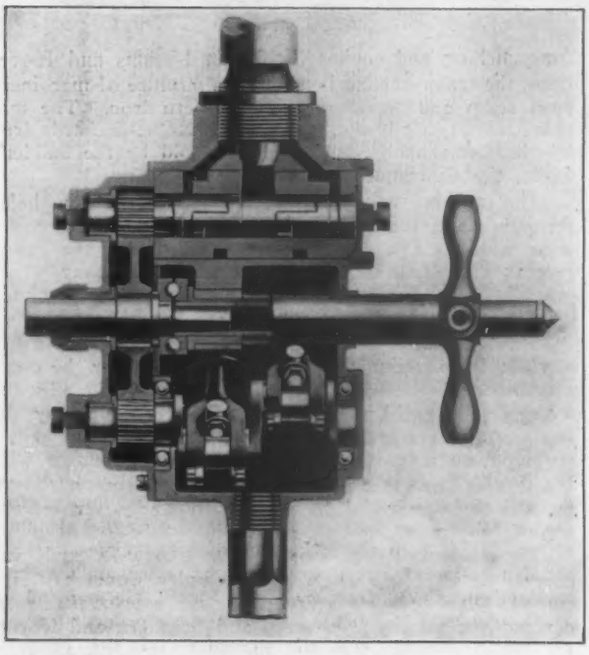
A number of new features are embodied in a new type of four-piston air drills that has recently been brought out by the Cleveland Pneumatic Tool Company, Cleveland, Ohio. The accompanying illustrations show the interior of the machine and an exterior view of one of the lever reverse drills. They are also made with the throttle handle reverse and non-reversible. The most important new feature is the mounting of the crank shaft upon annular ball bearings of the silent type in place of the plain bronze bearings heretofore used in drills of this type. Besides minimizing friction and wear and the heating of bearings.

The ball bearings serve to maintain the driving crank in a fixed position, without lateral motion which is injurious to pinions and large gears. It is claimed that extensive service tests of the ball bearing drill show a gain in power of more than 40 per cent. over the plain bronze bearing machines and a corresponding reduction in maintenance cost.

The valve is of the rotary duplex type, made of hardened steel and ground. It is placed between and equidistant from each vertical set of cylinders. As the valve is gear driven, it supplies air power automatically to each set of cylinders without variation. The top section of the valve controls the upper pair of cylinders and the lower section controls the lower pair. By having a single gear-driven valve controlling all four pistons a number of parts, such as eccentric straps, rocker arms, etc., are eliminated.

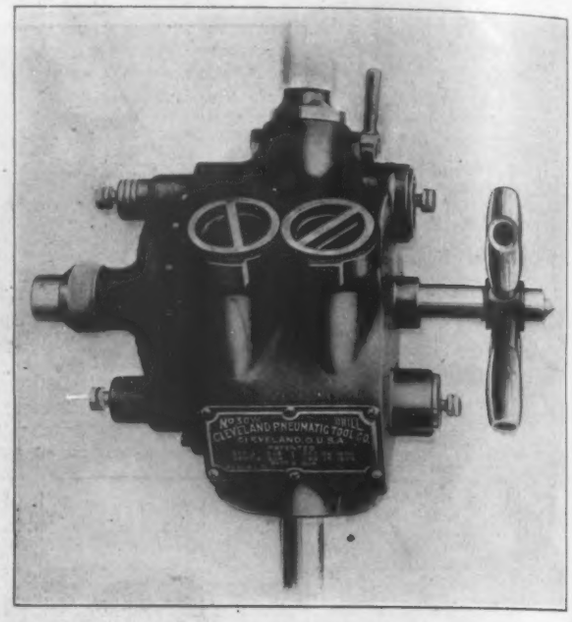
Another feature is in the construction of the pistons, which are secured to the connecting rods by a ball and socket joint, to allow universal motion and adjustment of wear, as well as the ready removal of individual parts. Still another feature is the enclosure of the gears in a chamber separated from the crank chamber by an aluminum shield plate, to protect the gears from accident and permit separate and permanent lubrication.

The machine has four single-acting pistons arranged in pairs, each pair of pistons being connected to opposite wrists of a double crank shaft. The body is a one-piece steel casting provided with hand holes through which



Interior of Four-Piston Air Drill made by the Cleveland Pneumatic Tool Company.

access is had to the crank and connections. The crank shaft is a drop forging, hardened and ground. The connecting rods are drop forged in one piece, minimizing the number of joints and connections. The main gear is also drop forged. The thrust or strain is not borne by the main frame of the machine, but passes directly from the drill bit to the feed screw by means of a spindle bearing in a fixed post mounted on a ball thrust bearing. By removing the feed screw the extractor pin can be inserted to drive out the drill bit or reamer. The spindle bearing is made extra long to protect the spindle and casing from heavy strain when the machine is used in a horizontal position. The handles are placed at opposite sides to balance the machine. One of these is the throttle handle to which the air hose is connected and is designed to regulate the speed. The throttle reverse drill



Cleveland Lever Reverse Air Drill.

is reversed by twisting the handle in either direction. The lever reverse drill is reversed by shifting the hand lever to the right or left.

The No. 30L lever reverse machine, which is shown in an accompanying illustration, has a capacity of 1¼ in. in drilling in steel, 1 in. in tapping and 2½ in. in flue rolling. It has a speed of 260 r.p.m. running light at 80-lb. pressure. The distance from the point of the feed screw to the end of the socket is 13 in., the distance from the center of the spindle to the outside of the casing is 4 in., and the length of the feed is 4 in. It weighs 37 lb. The same general details of construction are followed in the complete line of 40 odd air drills made by the company. These are designed to drive twist drills from ⅜ in. to 3 in.; they have a length of feed 2½ to 4½ in. and range in weight from 15 to 80 lb.

As an addition to its present line of air drills the Cleveland Pneumatic Tool Company has recently brought out a new compound drill designed for heavy drilling and reaming. These are also made with throttle and lever reverse as well as non-reversible. In design and construction the compound drills are similar to the company's line of standard drills, except that they are geared to lower speed to secure a great increase in power, extra gears being provided to reduce the speed. The gear case is constructed so that it fits on the body of the regular standard drill. In the standard machines the speed reduction is 5 or 6 to 1. In the compound machines a further speed reduction of approximately 3 to 1 is obtained. Each type of compound drill is made in two sizes with 1¼ to 2-in. and 2 to 3-in. capacity, and 3½ and 3¾-in. feed. The speeds of the non-reversible compound drills are 110 and 80 r.p.m. when running light with 80-lb. pressure. The speeds of the two sizes of throttle and lever reverse compound drills are 90 r.p.m. for the smaller and 65 r.p.m. for the larger machine.

The American Peat Society will hold its fifth annual meeting at Kalamazoo, Mich, September 21, 22 and 23. The president of this association is Dr. Eugene Haanel, Director of Mines, Ottawa, Canada, and the secretary is Julius Bordollo, Kingsbridge, New York City. A circular issued by the secretary extends a general invitation to the public. A peat fuel plant is to be shown at Kalamazoo in operation, under the direction of an experienced manager. The vicinity of the city will present an object lesson in the cultivation of peat bogs.

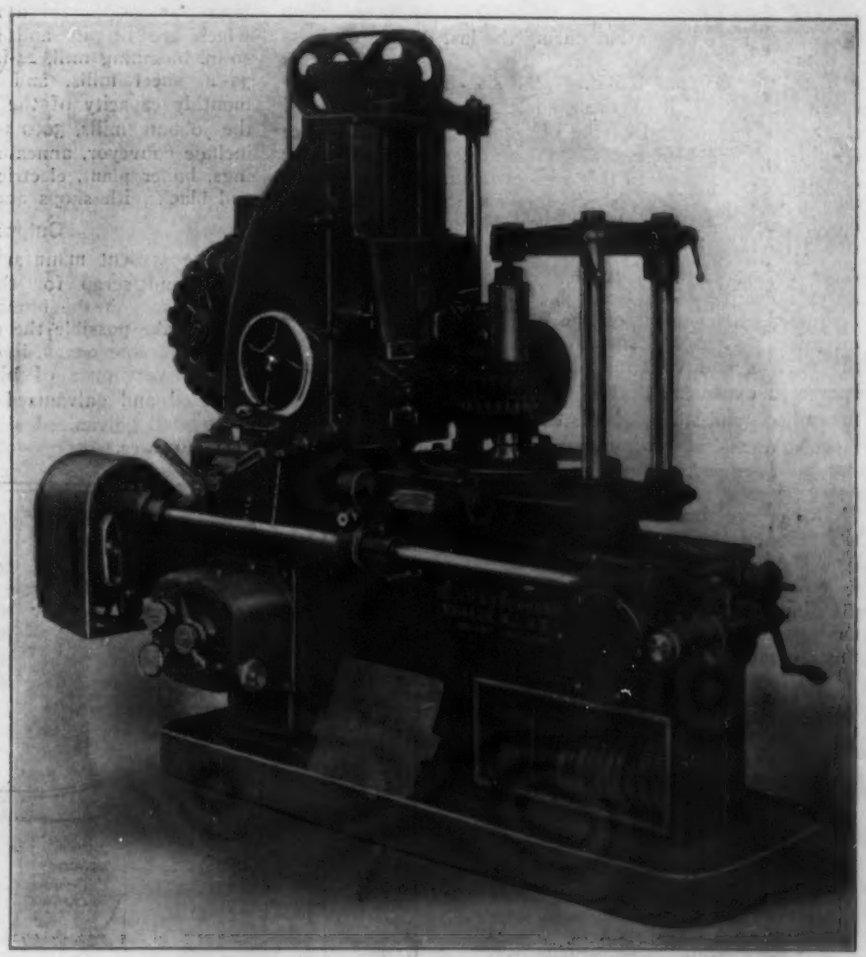
New Gould & Eberhardt Hobbing Attachment

An automatic worm wheel hobbing attachment and constant speed motor drive are two improvements recently made by Gould & Eberhardt, Newark, N. J., in its vertical gear cutter. The machine is designed for cutting spur and bevel gears 24 in. in diameter and having a face width of 8 in. The design of the cutter is such that it is well adapted for the hobbing attachment which in no way interferes with the regular operation of the machine. In the accompanying engraving the machine is shown cutting a steel worm wheel having 36 teeth of ¾-in. circular pitch and a 2½-in. face.

The hob is mounted on the vertical cutting cutter slide which is adjusted so that the center of the cutter arbor is in the line with the center of the blank to be cut, and it is then locked in position. A safety pin has been provided to hold the trip lever for the cutter slide feed and the return clutch in such position that the blanks are prevented from being spoiled by having the feed to the cutter slide or the return clutch engage and move the hob out of position. The direct reading cutter slide feed gear box dial can also be placed at zero, in which position the feed gears are disengaged and this serves as an additional precaution to keep the cutter slide from feeding.

A feed lever and a pawl, which receives its motion from the worm shaft through a worm and a worm wheel automatically care for the feeding of the blank, a cam and dial graduated in thousandths of an inch allowing the amount of feed per revolution of the blank to be changed easily. In this way the blank is fed to the proper tooth depth, and a dial graduated in thousandths of an inch is provided on the table feed screw as well as a scale and a vernier on the side of the machine, which allow the operator to ascertain the exact center distance between the cutter spindle and the work mandrel at any time.

A chart is furnished for the indexing mechanism to gear it according to the number of teeth in the worm wheel in the same way as for spur gears and means are provided for maintaining the proper relation between the hob and the work for the various numbers of revolutions of the cutter per minute. The arrangement of the indexing mechanism which is positive in action allows the work to revolve continuously. When the hobbing attachment is not required the worm on the worm shaft which imparts motion to the feeding mechanism can be easily disengaged. In this way the parts do not become worn by rotating while the machine is being used on spur or bevel gears. Safety precautions in the form of an adjustable guard over the driving pulley and the inclosing of all running gears are provided.



A New Hobbing Attachment for Spur and Bevel Gears Made by Gould & Eberhardt, Newark, N. J.

The Ashland Fire Brick Company, Ashland, Ky., is making extensive improvements, spending about $50,000 on its Ashland plant, practically rebuilding it, and expects then to have one of the most modern and complete plants for the manufacture of high grade fire brick in the United States.

The Production of Graphite in 1910

According to the United States Geological Survey, the production of natural graphite in the United States in 1910 was 35,945 net tons of amorphous graphite, mainly used for fertilizer filler, valued at $81,443, and 5,590,592 lb. (2795 net tons) of crystalline, valued at $295,733.

The production of artificial graphite at Niagara Falls, which had averaged 6,000,000 lb. (3000 net tons) for a number of years, increased to 13,149,100 lb. (6574 net tons) in 1910, being valued at $945,000.

The imports for consumption of graphite into the United States in 1910 came mainly from Ceylon and Mexico, and were nearly the same in quantity and value as in 1909. It is significant to compare the total value of the imports, $1,872,592, with the total value of the domestic product, both natural and artificial, which was $1,322,176. The domestic demand for graphite and graphite products is undoubtedly increasing, and it is encouraging to note that this demand is being met principally by increased domestic production rather than by increased importation. Domestic flake graphite is replacing the Ceylon graphite to some extent in the manufacture of crucibles for the metal industries. There appears to be no reason why this replacement should not increase, for in Germany flake graphite similar to much of the American product has for generations been successfully applied to this use.

The John A. Roebling's Sons Company, Trenton, N. J., states that the item appearing in the daily papers to the effect that its plant has shut down is misleading. The fact is that one of the company's wire rope shops has been temporarily closed. This is due to a slack demand for the sizes of wire rope made in that shop, a stock having been accumulated which is as large as it has been deemed advisable to carry under present conditions. The greater part of the plant is in active operation.

American Rolling Mill Company

New East Side Works at Middletown, Ohio

(With Supplemental Plate.)

Twelve years ago the American Rolling Mill Company began to roll sheets at Middletown, Ohio. At that time a 12-acre tract provided ample land for the mill in which operations were begun, but during the last decade business has been doubled each year. To keep pace with this growth the original building and site have been freely extended. With all of these additions the limitations of the original plant and of the original ideas in accordance with which the business was inaugurated have remained as fixed restrictions. In this present plant, which is known as the Central Works, sheet bars are the only semi-finished material rolled and 10 x 10-in. blooms are the largest size from which the mill is capable of rolling. It became apparent, therefore, that the future requirements of this company could not be met successfully by any continued enlargement of the old mills, but only by the inception of a new plant so planned as to have wthin it the nucleus and full possibilities for a natural and unhampered expansion. Thus in the growth of one decade the outlook and status of this company have changed from those of the small mill, engaged in light rolling mill practice, to a perspective large enough to embrace a self-contained plant working from the ore through to any and all of the finished products in the full range of sizes.

Proceeding on this broadest possible plan, a tract of land on the outskirts of the town and a comparatively short distance from the old plant was acquired. This site is approximately one mile long in a north and south direction, and about three-fourths of a mile wide. In addition for the possible future handling of iron ore, a strip of land was bought extending from the projected location of the blast furnaces on the plant site to the Ohio River canal which passes through Middletown and connects with Lake Erie at Toledo. In this manner a permanent water frontage was assured. The ground selected is high, commanding a view of the surrounding country, and required a considerable amount of grading to bring it to a uniform level. Building was begun in March, 1910, and the first sheets were rolled August 7 of this year. The general plan adopted and the furnace and mill units now being completed in the present building project are indicated in Fig. 1.

Arrangement and General Equipment of Works

The layout in its essentials is similar to that of the Indiana Steel Company's plant at Gary, modified in keeping with smaller capacity requirements. As distinguished from the Gary plant, however, the future blast-furnace installation will have its axis at right angles to the direction of the parallels in which the rest of the plant is arranged. The progress of the metal will be continuously in a forward direction from the open hearth to the shipping warehouse. The plans were drawn to provide for a free extension of all departments and at the same time to avoid having the distances between the original units so great as to result in a scattering of the plant. The plans were prepared and the erection supervised by A. B. Neumann, consulting engineer, Chicago.

The plant to be completed at this time includes an open-hearth building containing three 65-ton furnaces, with foundations for a fourth, a soaking-pit building, in which are 12 pits and space for an additional four, a 40-in. blooming mill, 24-in. billet and sheet-bar mill, eight 30-in. sheet mills, and two 30-in. jobbing mills. The monthly capacity of the sheet mills is 5000 tons, and of the jobbing mills, 3000 tons. The accessory facilities include conveyor, annealing, storage and warehouse buildings, boiler plant, electric power house, auxiliary machine and blacksmith shops and storehouse.

Output of the Works

The present manufacturing process begins from cold metal and scrap for the open-hearth charge. It continues through the blooming mill, which is so arranged as to make possible the delivery of slabs, billets or sheet bars from the one mill. It terminates with the delivery to the warehouse of plates up to No. 10 gauge, blue annealed and galvanized plain sheets in all gauges and corrugated galvanized sheets for roofing, siding and culvert purposes.

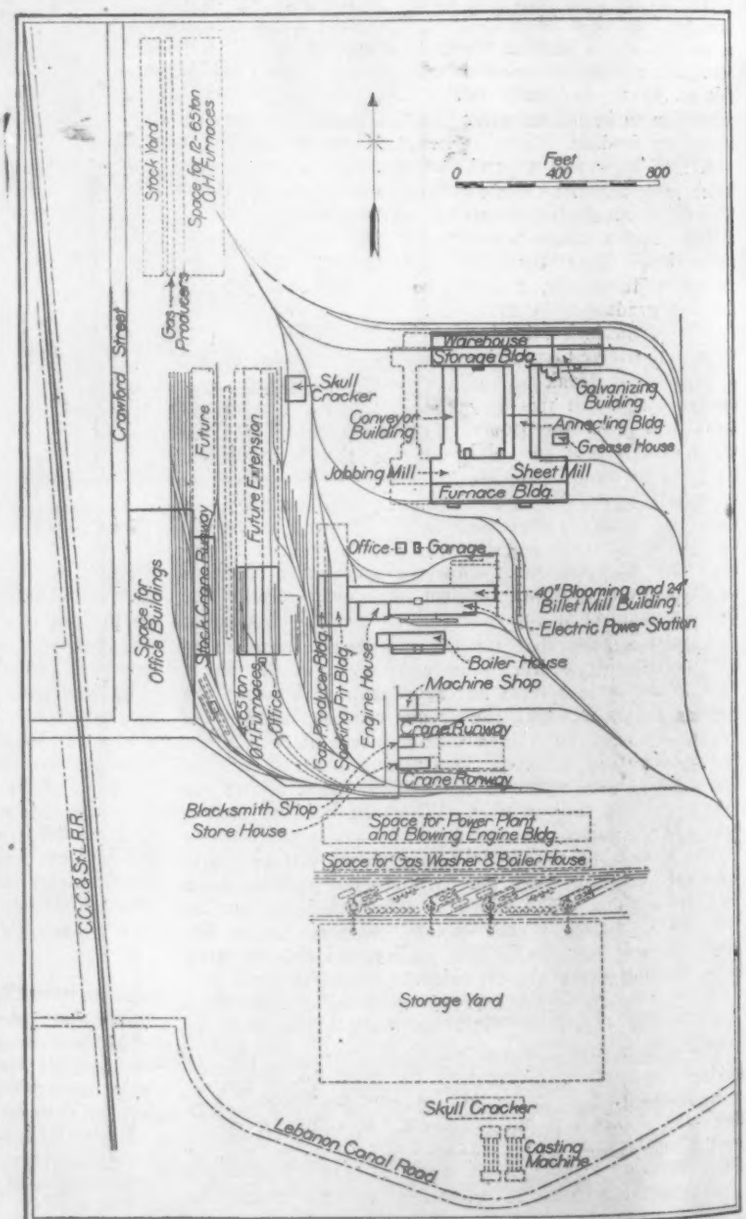


Fig. 1.—East Side Works of the American Rolling Mill Company, Middletown, Ohio.

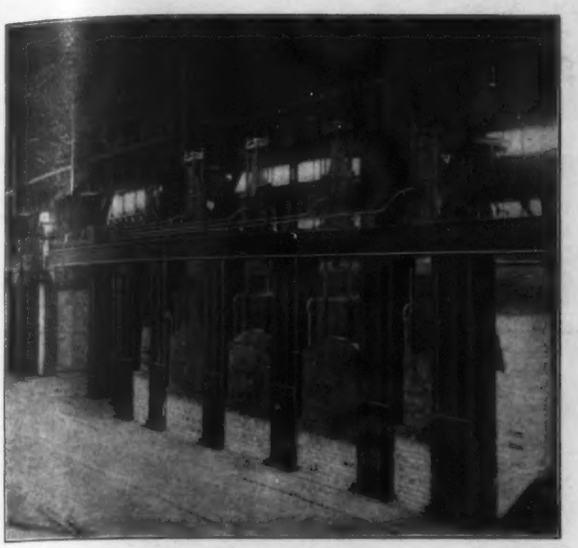


Fig. 2.—Front of Open-Hearth Furnaces, Showing Hydraulically Operated Doors.

In the nomenclature of the American Rolling Mill Company this plant is an "ingot iron" rather than a steel plant. The reasons and occasion for this distinction were given in detail in a paper presented before a meeting of the American Society for Testing Materials, by Dr. A. S. Cushman, and may be found in the July 13, 1911, issue of *The Iron Age*. In brief, the name Ingot Iron is construed as desirable and properly applied to a metal, which, in making, is handled mechanically, the same as mild or soft open-hearth steel, but in contrast is deliberately overoxidized to accomplish a maximum removal of impurities, particularly carbon and manganese. The discussion upon this particular subject can be found elsewhere, its significance here being confined to the point of the unusually high furnace temperatures involved. This high temperature at which the open-hearth furnaces are to be worked required the binding and lining to be specially designed.

Open-Hearth Building

The open-hearth building is 337 ft. 6 in. long, by 166 ft. 3 in. wide. Reference to Fig. 3 will illustrate the type of building and the layout. The building columns are of heavy double I-beam section and the roof trusses are liberally braced and very stiff. In the open-hearth building as in all other parts of the plant, the fabrication of the steel included all holes necessary for carrying the electric wires and cables, none of which were drilled in the field. The structural features include numerous galleries and platforms for crane men and others, the element of safety to employees being carefully considered. One provision of special interest, which has been called the safety platform, is intended as a refuge from flying hot metal for those who work on the pouring platform. As indicated, it is carried on the outside of the building columns, paralleling the pouring platform for a length of 150 ft. On the four bays included in this length the corrugated siding is carried down to the platform floor and the escape exits from the pouring platform to the safety platform are 3 x 7-ft. openings in this siding located in the center of each bay.

The cross-section of the open-hearth building provides a cold metal, scrap and refractories stock floor, 36 ft. 6 in. wide and carrying two standard gauge tracks; a charging floor bay which includes the open-hearth furnaces, 69 ft. 4 in. wide, and a pouring floor 60 ft. 5 in. wide. The charging floor is reached from the plant yard by but one trestle at present, but provision is made for a second when future furnaces are built. The charging floor is 12 ft. 6 in. above the yard level. A standard Morgan Engineering Company's charging machine is installed. As long as cold metal is used no crane will be necessary in this bay, but providing for a time when the plant will include blast furnaces the columns are designed to carry a 75-ton ladle crane with 15-ton auxiliary.

The pouring floor is traversed by two tracks for the handling of ingot molds and supplies, and is spanned by a 125-ton crane with a 25-ton auxiliary with a clearance from floor to runway rail of 38 ft. 11 in. For serving the furnaces, three 10-ton electrically operated jib cranes are hung from every second column. These cranes may be swung by a hand crank operating through a worm and worm-wheel which is arranged to be clamped rigidly to the crane post.

The three furnaces and the foundations for the fourth are spaced along the building at 75-ft. centers. The furnaces rest on a ¾-in. hearth plate, laid on 15 in. I-beams, spaced about 18 in. apart. These are carried on concrete piers which leave the space underneath the furnaces and around the regenerator chambers open and accessible. Around the entrance into each of the slag pockets, a pit has been built which affords ample room for entering and cleaning out. The furnace binding is very heavy and is entirely self-contained. At present the furnace is oil-burning and so the end brickwork around the ports is narrower than for gas burning. The furnaces are designed for the use of gas, however, and I-beam fillers are now used for supporting the end brickwork within the buckstays.

The furnace hearth is 34 ft. long and 14 ft. wide. The arched roof is made of 12 in. of silica brick with

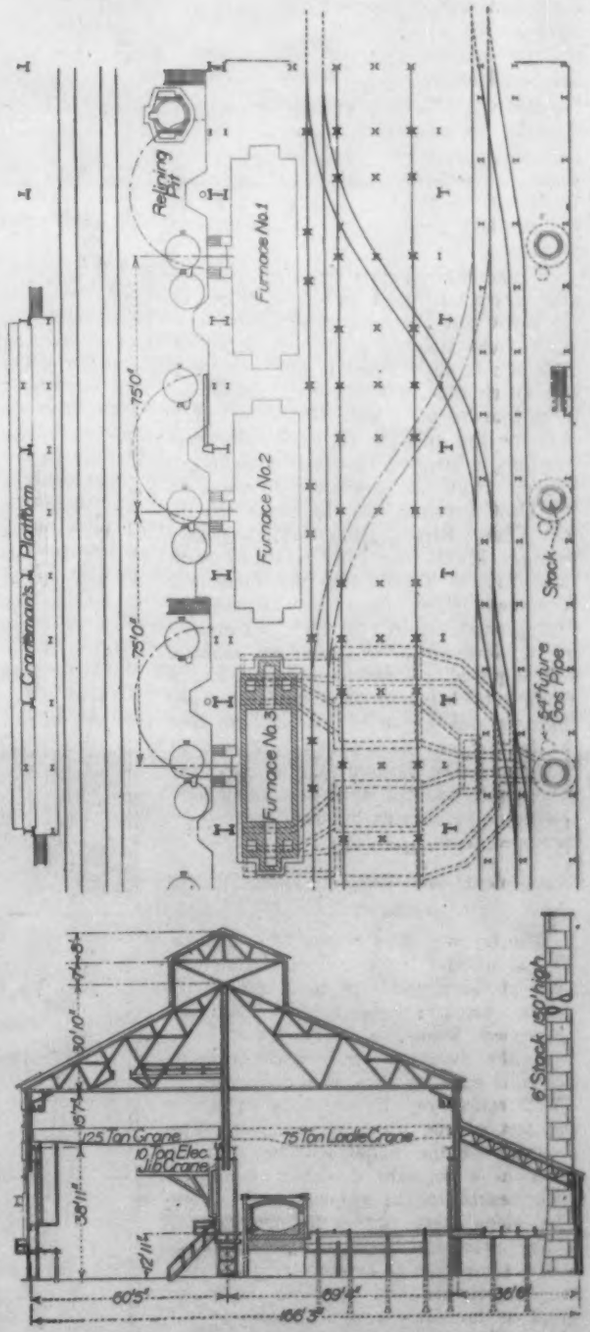


Fig. 3.—Part Plan and Sectional Elevation of Open-Hearth Building.

18-in. side walls. The bottom of the hearth is made of 13½ in. of magnesite, which, because of the high temperatures, is made to extend up on the sides with a thickness of 18 in. to the sill line, 3 ft. 5½ in. above the bottom. No neutral joint is used between the magnesite and silica brick. The furnaces are rated at 65 tons. There are three charging doors, 3 ft. 6 in. by 2 ft. 6 in., and one small door at each end. All are hydraulically operated. The regenerator chambers are of standard character providing usual heating and capacity ratios. Only air valves are at present required and they are of the standard Velte type, operated by special hydraulic device designed by the supervising engineer.

The pouring ladles are rated at 80 tons. They are of ordinary design, except in the locating of the tap hole 18 in. from the center of the ladle bottom, which throws it 3 ft. off the furnace center in pouring. This was done as a precaution against the cutting out of the tap hole plugs by the unusually hot ingot iron. Provision is made, however, for a tap hole in the center as ordinarily and conversion would be very simple. The slag ladles and cars were furnished by the Wm. B. Pollock Company, Youngstown, Ohio, and are of the type described in *The Iron Age* of August 17.

The open-hearth plant also includes a small plant for preparing the refractories for the lining. A stock yard for pig metal and scrap is located just west of the open-hearth building. This yard is spanned by a 10-ton crane carried on a self-supporting runway about 450 ft. long and 85 ft. wide. A noteworthy adjunct of this runway is a roof and housing which spans it and is of a length ample to cover the crane. The crane can thus be run under this protection when not in service and so be sheltered from the weather.

Soaking-Pit Building

The ingots are stripped in the soaking-pit building under a 100-ton Morgan Engineering Company's stripping crane. The general arrangement of this building is shown in Fig. 4. It is 192 ft. long with a main bay 84 ft. wide and a side bay in which the gas producers are located 30 ft. wide. In the soaking-pit building and the open-hearth as well, a runway is carried through the trusses for a 10-ton repair trolley. This can be reached by a ladder, railed walk and stairs.

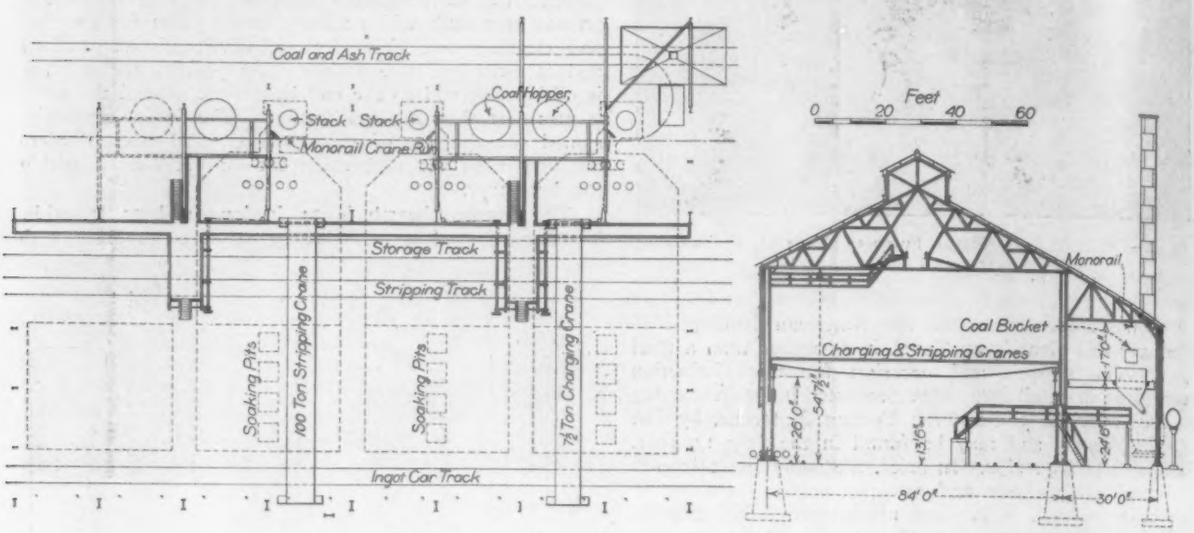


Fig. 4.—Part-Plan and Sectional Elevation of Soaking-Pit Building.

The soaking pits are built up on a solid concrete foundation and are 5 ft. 6 in. x 7 ft. inside, accommodating six 20 x 22-in. ingots. The covers are hydraulically operated. Experience with the flooring around the pits has shown that the ordinary steel plates warp after a time under the change of temperature. In this building the floor plates are of cast iron, 2½ in. thick. The pits are fired with producer gas generated in three Hughes mechanical gas producers built by the Wellman-Seaver-Morgan Company, Cleveland, and located as indicated in Fig. 4.

The air and gas valves controlling the supply to the soaking pits are opened and closed automatically by a

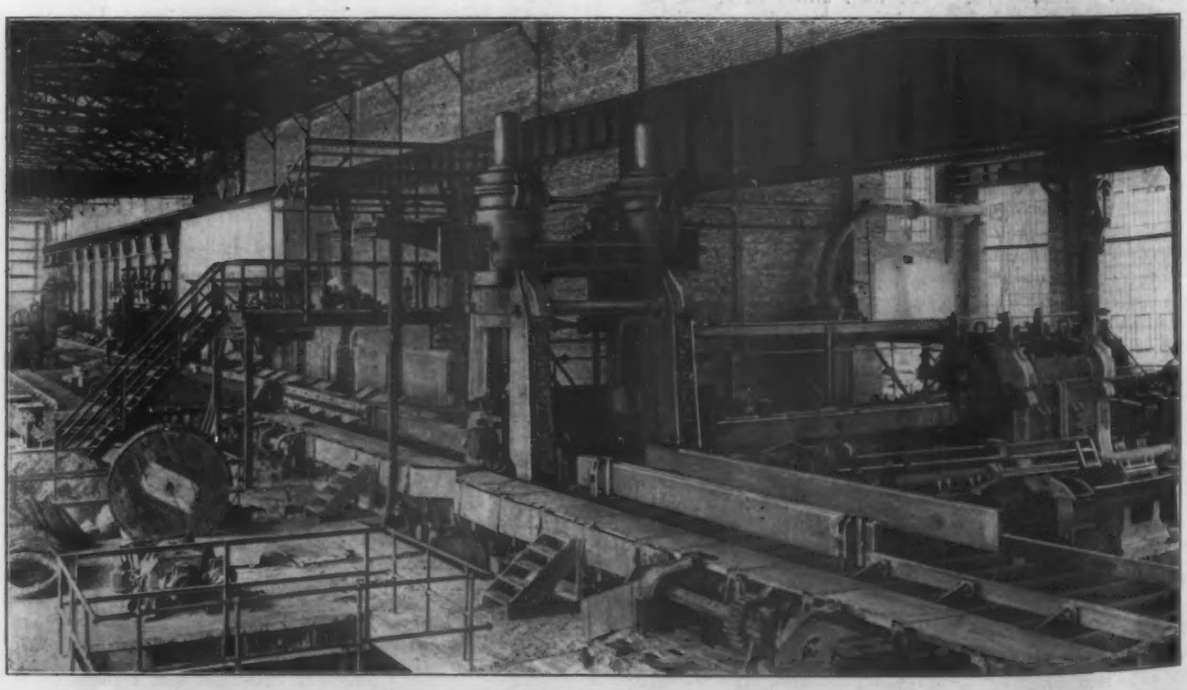


Fig. 5.—Blooming Mill Rolls, Manipulating Tables and Operators' Stand.

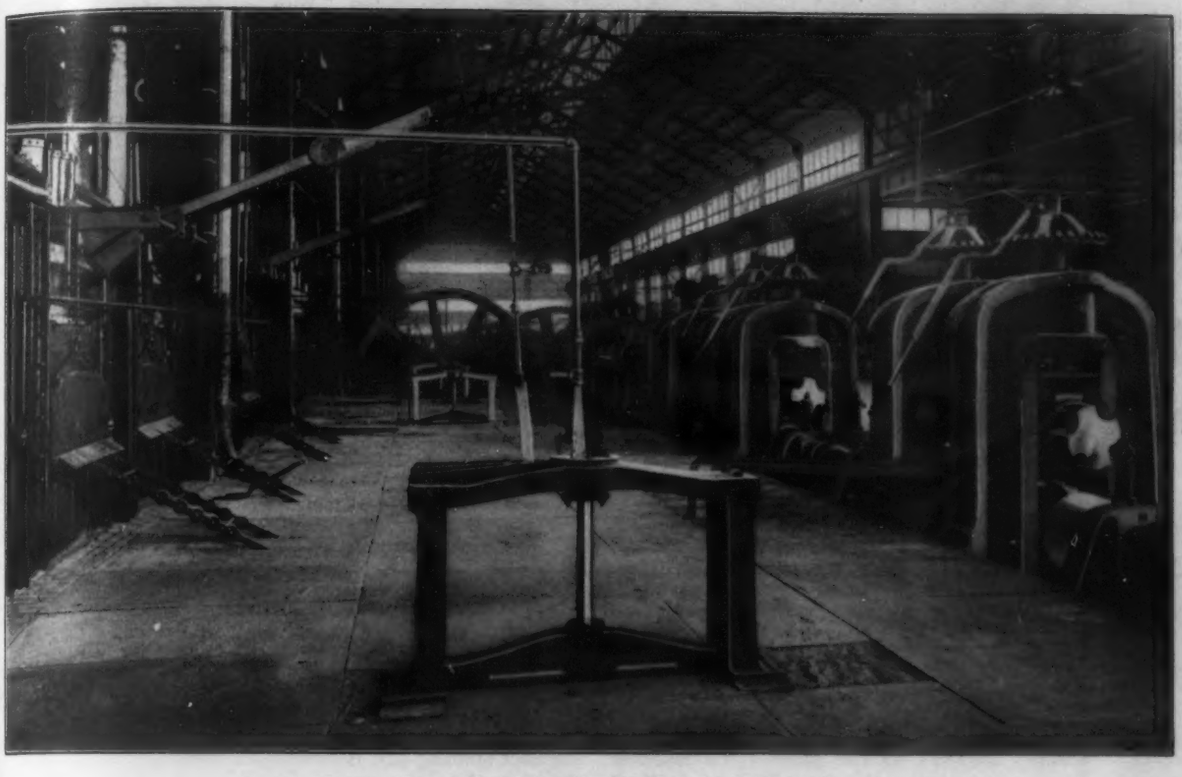


Fig. 6.—Sheet Mill Stands, Showing Drive in Background.

specially designed alternating device. The gas valves are also of new design, particularly with respect to the external contour for baffling the cooling water. The gas producers are arranged in pairs and are fed from a 30-ton coal hopper over each pair having a spout into each producer. These hoppers are filled from a monorail grab-bucket carrier which traverses the producer bay and is loaded direct from cars on the coal and ash track which parallels the building or from the coal-track hopper, as illustrated, in plan, in Fig. 4.

Fig. 7.—View of the Annealing Furnaces.

The two tracks for the stripping and storage of ingots traverse the building between the producers and the soaking pits and are laid on steel ties set in concrete. Two bridges span the tracks and lead from the producer floor to the top of the soaking pits. The ingots are charged into the pits and loaded on the ingot transfer car by a 7½-ton Morgan charging crane. The ingot transfer car is of the tipping type and is electrically operated along the length of the soaking pits under control from the blooming-mill pulpit.

The Blooming, Billet and Bar Mills

The mill building opens directly off of the soaking-pit building into which the mill approach table projects about 6 ft. In contrast to the more common type of mill building where the mill and its drive are housed in a transverse crane-runway bay at right angles to the run of the mill, this building is designed as indicated on the supplemental plate. The mill building proper is 575 ft. long and 60 ft. 6 in. wide. The general arrangement of the 40-in. blooming mill, the 24-in. billet and bar mills, and of the various tables, shears and conveyors, all of which were built by the United Engineering & Foundry Company, are illustrated. The engine drives for the blooming and bar mills and the location of the electric power station are likewise shown.

An analysis of the mill layout will make apparent the unusual flexibility of the mill. Taking an ingot 20 x 22 in. which is as large as good economy in heavy mill practice requires, the blooming mill will deliver 8 x 8 in., or 7½ x 5-in. blooms, the former for conversion into billets and the latter for sheet bars. In addition the mill will permit an arrangement of the rolls to roll down to slabs 34 in. wide or to 4 x 4-in. billets. On occasions when 4 x 4-in. billets are rolled on the bloomer, they may be transferred across from the blooming-mill run-off table to the approach table of a 6 x 35-in. shear from which the billets are run out and kicked off to a billet conveyor. This same table arrangement will serve in event of the mill being used at some future time for rolling heavier plates for handling slabs from the bloomer to a plate mill to be installed at that time.

Ordinarily the blooming mill will deliver blooms of the sizes mentioned above. These pieces will be carried through the 10 x 10-in. shear, (the butts dropping into the butt conveyor beneath) to the approach table of the 24-in. billet and bar mill. This shear is shown on the

Fig. 8.—Motor for Driving Sheet Mill Roll Train.

Fig. 9.—Front View of Sheet Mill and Rope Drive.

plate opposite the 6 x 35-in. shear. The 8 x 8-in. blooms to be made into billets are given three passes through this stand, following which they are run out and transferred over to a billet shear and bar piler, from which they are picked up by the crane in the yard at the end of the mill building. The large sheet bars for the jobbing mill are run through in the same manner with the proper roll changes. In rolling 8-in. sheet bars the 7½ x 5-in. bloom is given but two passes in the first stand, when it is transferred over and goes through four passes in the second stand followed by one pass in the finishing stand. The run out delivers the sheet bars to the hot-beds from which they are delivered to a bar shear and bar piler, then to the storage yard.

The 40-in. blooming mill is a two-high reversing mill direct driven from a 55 x 60-in. double-reversing Mesta mill engine of 12,000 hp. The mill rolls are 40-in. diameter and 82 in. long. The driving spindle is 20 ft. long with a diameter of 16½ in. over the pole. The top roll has a lift of 34 in. The mill and pin housings, shoes, couplings and boxes are steel castings of very heavy, though not unusual, design. The screwdowns are motor driven. The mill tables are equipped with Wellman-Kennedy manipulators hydraulically operated under a pressure of 500 lb. The table motors throughout are Westinghouse mill-type direct current.

The blooming mill transfer table is of the rope drag and is designed to transfer a bar 70 ft. long and weighing about 8000 lb. The 10 x 10-shear and the 6 x 35-in. shear are motor-driven down-cut pattern, the former equipped with a tilting table, tilted by the motion of the shearing head and a stop gauged to shear up to 14-ft. lengths. The 6 x 35-in. shear is equipped with a tilting drawback table operated by hydraulic power and the shear delivery table is equipped with a motor-driven kick-off which throws the pieces into a conveyor.

The 24-in. combined billet and bar mill consists of three stands of rolls, two of them three high and the third, two high, with passes as outlined above. The first stand is essentially a billet mill with two sheet-bar passes, the second stand a sheet-bar mill with four passes, and the third a set of bullheads with a sheet-bar finishing pass. The speed of the 24-in. mill is about 85 r.p.m. The roll housings are of heavy cast-iron construction of the open-top pattern; the pinion housings of the enclosed type. The mill is driven by a 48 x 60-in. Wisconsin Corliss single-cylinder engine of about 2500 hp. The cooling beds are 150 ft. long, built with 60-lb. rails carried on structural posts and equipped with a rope and drum drags having 40-lb. rail buggies. The 54-in. sheet-bar shear is motor driven, equipped with a quick adjustable stop and designed to shear five 8-in. bars at one cut. A bar piling cradle is installed in connection with the shear.

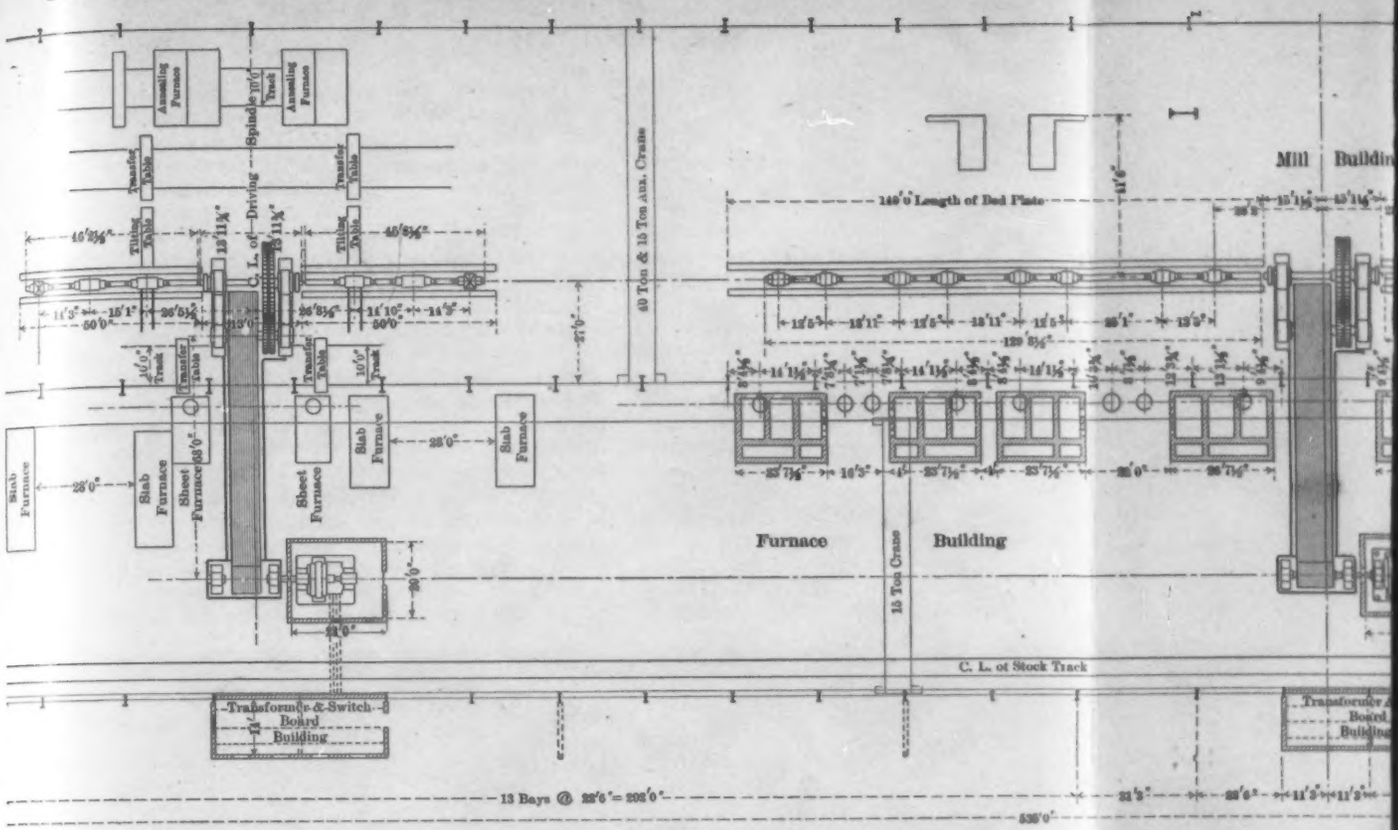
The table and mill of both mills are designed to free themselves readily of mill scale, and the table brackets and bearing stands permit access under the rollers for the purpose of removing the ordinary accumulations. The concrete foundations upon which the blooming mill shoes, mill and approach tables rest are designed so that for a considerable distance under the tables and under the full length of the mill shoes, the mill scale is washed down sloping concrete pockets and out into a water-filled scale pit. For easy access from one side of the blooming mill to the other, a concrete tunnel passing under the mill table, has been built.

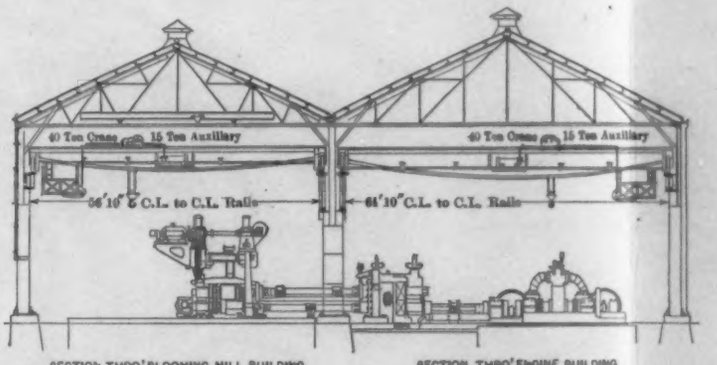
The Finishing Department of the Plant

The finishing department of the plant—that part which includes and is accessory to the 30-in. sheet and jobbing mills occupies a group of five buildings arranged in the form of a hollow square as shown in Fig. 1. The furnace building 535 ft. long and 881 ft. wide, parallels the mill building and is continuous with it, there being no partition along the common column line between the two buildings. The mill building is 92 ft. 4½ in. wide. At right angles to these buildings and connecting them with the storage and warehouse building are the annealing and conveyor buildings, each 340 ft. long. The former is 134 ft. 6 in. wide, and the latter 50 ft. The distance between the parallel center lines of these buildings is 278 ft. 9 in. The storage and warehouse buildings is 469 ft. 6 in. long and 119 ft. wide.

Reference to the general layout, Fig. 1, will show that the trackage layout from the storage yard at the end of the mill building provides for bringing the semi-finished material in on the track that traverses the furnace building at either end of the building. The stock track runs in on the floor in the rear of the furnaces where a clear width of about 45 ft. is available, spanned by a 15-ton crane with a lift of 35 ft. for handling material into the heating furnaces. The arrangement of the eight heating and pair furnaces is shown on the supplementary plate and their relative location with reference to the sheet and jobbing mills. The furnaces are of a special design developed by the American Rolling Mill Company, particularly with a view to rapid heating and

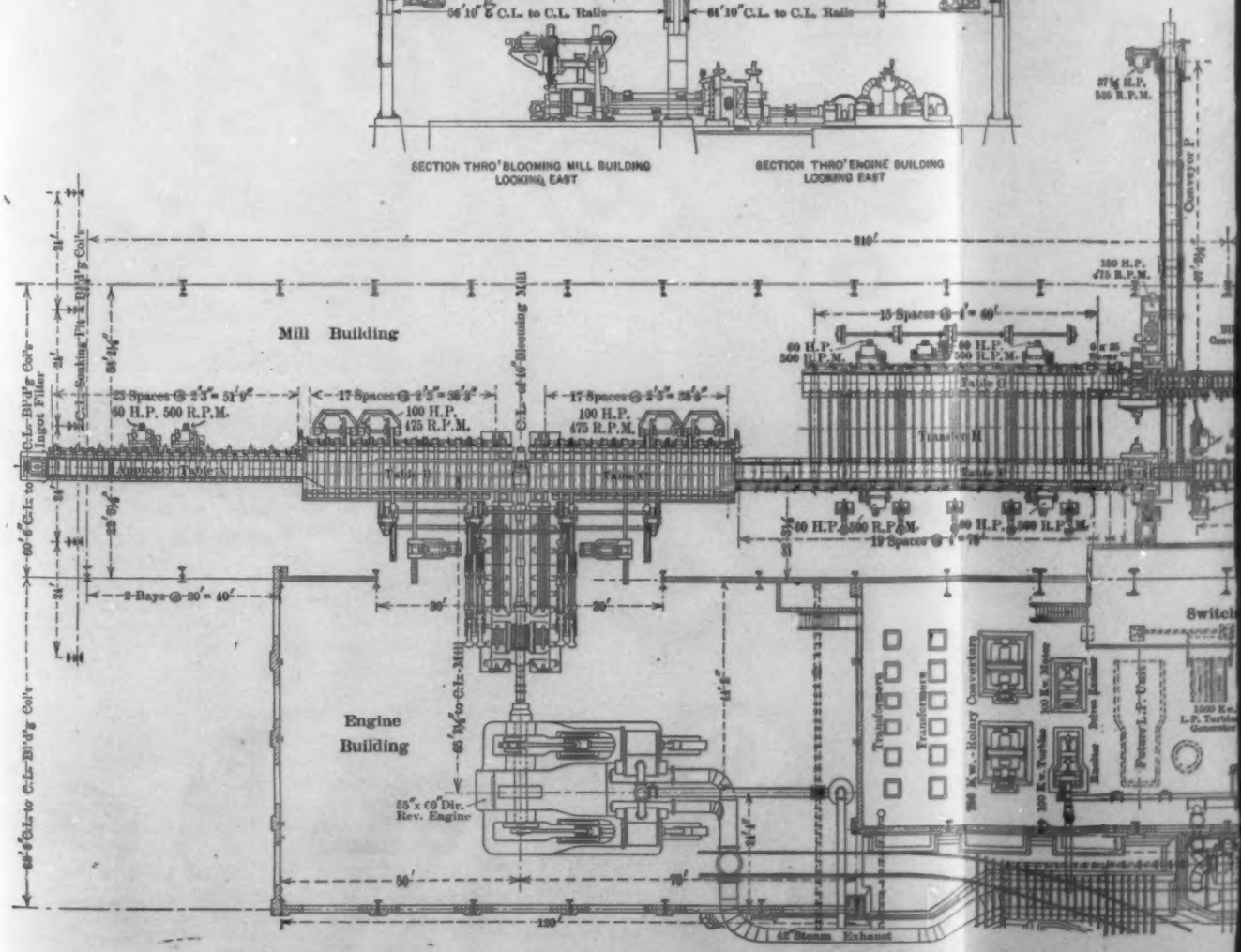
Fig. 10.—Cold Rolls with Slow Motion Device.



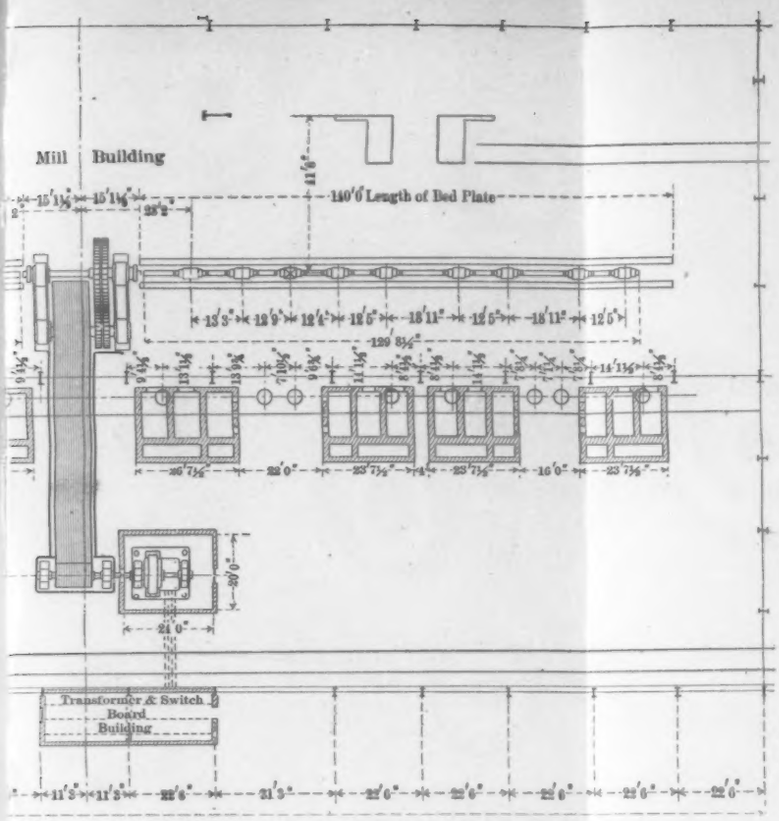


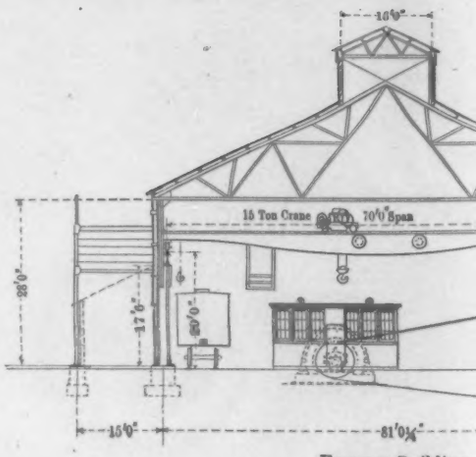
SECTION THRO' BLOOMING MILL BUILDING LOOKING EAST

SECTION THRO' ENGINE BUILDING LOOKING EAST



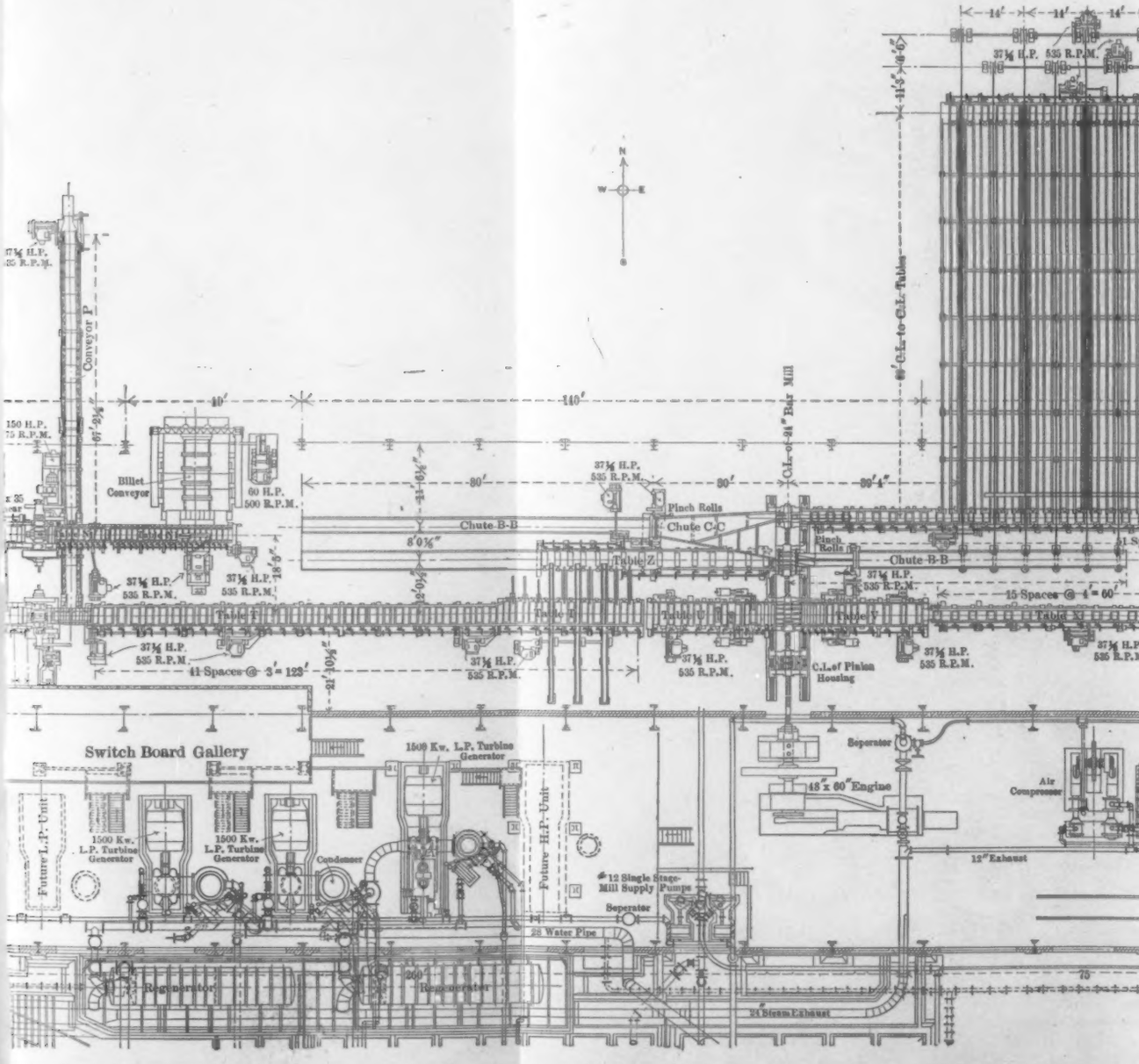
BLOOMING, BAR, SHEET AND JOBBING



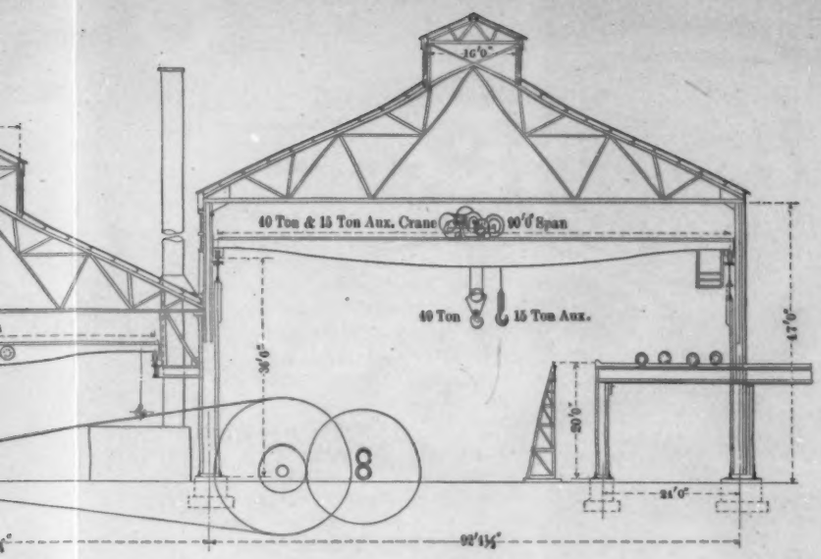


Furnace Building

EXPLANATION: The plan at the bot
the right the 24-in. bar mill. The plan
pressure steam turbine units run conde
storing the exhaust being shown. The
and at the right the 30-in. sheet mill, wi
jobbing mill extends the conveyor build
the sheet mill extends the annealing bui
where in this issue.



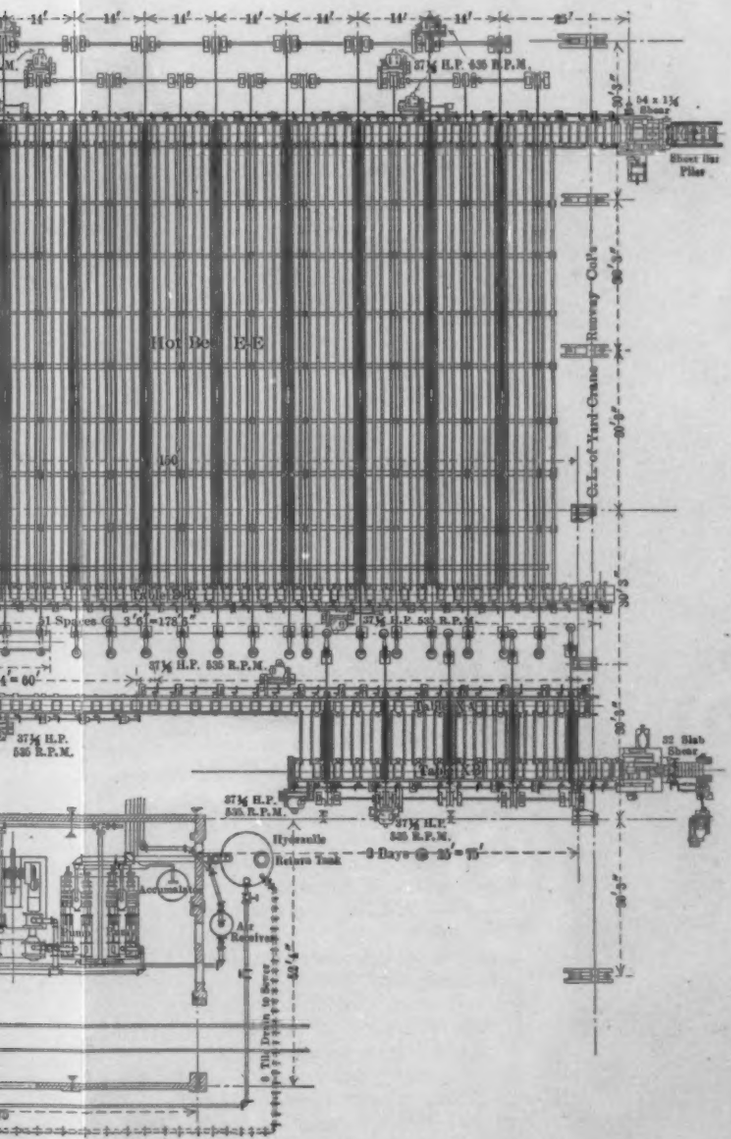
JOBBING MILLS OF THE AMERICAN ROLLING MILL COMPANY, MIDDLETOWN, OHIO



uilding

Mill Building

he bottom of this plate shows at the left the 40-in. blooming mill and at
e plan shows also the electric generating plant of the works with the low-
condensing with exhaust steam from the mill engines, the regenerators for
. The plan at the top of the plate shows at the left the 30-in. jobbing mill
mill, with the adjacent furnaces. Northward from the building opposite the
r building to the storage building and warehouse and northward opposite
ing building, as shown on the general plan of the works reproduced else-



economical handling. One heating and pair furnace is provided for each sheet mill. For the 48 x 44-in. mills the furnaces are 7 x 11 ft. inside and for the other mills 6 x 11 ft. The location of the furnaces in this manner each with individual stacks rising directly through the roof necessitated a special provision for the crane runway on this side of the building. By means of a structural crane work this runway was suspended 10 ft. out from the columns as illustrated in the sectional elevation on the supplement. The furnaces are oil fired.

The 30-in. sheet-mill plant consists of 8 mills arranged as shown in the plate, with four mills on each side of the mill drive. The mills are driven from a leading spindle in the ordinary manner. The mills are arranged with a 48-in. finishing mill immediately at the left of the drive followed by a 48-in. balanced roughing mill, just beyond which is a set of pinions. Beyond the pinions is a set of 38-in. balanced roughing rolls and a set of 38-in. finishing and jump-roughing mills. At the opposite side of the drive beginning with a 44-in. finishing mill, a 44-in. jump-roughing mill, three 38-in. jump-roughing mills and three finishing mills follow in order. This arrangement provides that the balanced-roughing rolls are on each side of the pinions from which both upper and lower rolls are driven while for the remainder of the mills only the lower rolls are driven from the spindle, the upper rolls being rotated by contact. It will also be noted that the mill is laid out with a set of roughing rolls for each finishing stand.

The bed plates for each set of eight mills are 140 ft. long. The spread of the shoes is 7 ft. high, the height 15 in., and the total width 3 ft. 3 in. The weight of the bed plate per foot is 625 lb. The spindles vary in length from 4 ft. 6 in. to 11 ft., the latter having two carriers. The wabblers for the spindles are of the four-pod type, 21 in. outside diameter. All of the spindles and coupling boxes are of annealed-steel castings. The rolls have necks 23 in. in diameter by 18 in. long. Four sets of roughing rolls 38 in. long are chilled-sand rolls; the rest are carbon-specified steel castings. The housings for the mills are steel castings of the I-section type with 15-in. flange and 20-in. webs for the roughing stands and 24-in. webs for the finishing stands. The total weight of the mill with the rolls approximates 2,500,000 lb. The sheet mills were furnished by the National Roll & Foundry Company, Avonmore, Pa.

The rope drive for the sheet mills is centrally located with respect to the mill. The drive consists of a 1500-hp., three-phase, 25-cycle Westinghouse motor with a full-load speed of 210 r.p.m., connected through a flexible coupling to a rope sheave grooved for forty 2-in. ropes. The motor is designed to have a pull-out torque two and a half times the full-load torque. The rope wheel is 24 ft. in diameter, weighs 200,000 lb. and is geared down to the driving shaft through a pinion and gear to a speed of 28½ r.p.m. From the center of the rope sheave to the center of the rope wheel the distance is 60 ft. The pinion and gear are acid open-hearth-steel castings, machine molded in halves, 7½-in. pitch, 46-in. face, the former with 44 teeth and the latter 98.

Between the sheet mills and the annealing building a 24-in. cold mill, Fig. 10, built by the National Roll & Foundry Company, is installed, consisting of four stands of 24 x 48-in. rolls, mounted on cast-iron shoes having an overall length of 90 ft. The rolls have necks 17 in. in diameter and 13½ in. long. The mill is driven from a 250-hp., three-phase, 25-cycle, 220-volt Westinghouse motor. The motor is coupled to a driving shaft on which is mounted a driving pinion which meshed with a gear on a jack-shaft that in turn is coupled to the mill. The gear drive is entirely enclosed. For a further reduction of the mill speed a slow-motion device is supplied consisting of a 20-hp., compound-wound, direct-current motor running at 975 r.p.m. This motor is mounted on a cast-iron-girder base, which can be bolted on the mill shoes. The motor has a gear drive of such ratio as to turn the mill rolls at a speed of ½ r.p.m. The drive is arranged to be located at one end of the mill and is self-contained so that it may be removed when not in use.

Fig. 11.—Jobbing Mill Rolls and Drive

The general arrangement of the jobbing mill, shown in the plate is similar to that of the sheet mill with a central-rope drive and one mill of two stands on each side. One mill consists of one stand of 30 x 62-in. two-high-jump finishers and one stand of 30 x 72-in. two-high, balanced roughing rolls, and one stand of two-high, 30-in. pinions, On the opposite side of the drive the mill comprises one stand of 30 x 68-in. two-high finishers, one stand of 30 x 72-in. two-high-balanced roughers and one stand of two-high, 30-in. pinions. The bedplates for these mills are each 50 ft. long. The roll necks and couplings are similar to those of the sheet mill in dimensions. The housings also are like those of the sheet mills having posts of I-beam sections, 15 x 26 in. for the finishing stands and 15 x 25 in. for the roughing stands.

The screw-down mechanism on the finishing stands consists of a bevel gear and handwheel equipped with a clutch for throwing one screw out of gear to permit a convenient aligning of the rolls. A motor-driven screw-down is used on the roughing stands with a speed adjustment between the screw and motor and an arrangement to permit of the individual adjustment of the screws by hand. For handling the pieces being rolled in this mill, lifting tables are provided at both sets of roughers and at the finishing mill there is a tilting table on the catcher's side of the mill and a stationary table on the roller's side. The handling is further facilitated by transfer tables. The jobbing mills were built by the Mesta Machine Company, which also furnished the rope drives.

For heating the material for the jobbing mills there are installed two sheet furnaces, one on each side of the drive and four slab furnaces, two on each side. Transfer tables arranged to be operated along 10-ft. gauge tracks are installed for the convenient handling of the steel to the furnaces and also to the four annealing furnaces located in front of the mill.

The rope drive for the jobbing mill is similar in design to the sheet-mill transmission. The driving motor is rated at 1000 hp. with a full load speed of 240 r.p.m.

Fig. 12.—Jobbing Mill Conveyor Building.

The rope sheaves are grooved for thirty 2-in. ropes and are of relative diameters to give through the driving pinion and gear a spindle speed of 31½ r.p.m. The distance from center to center of the sheaves is 68 ft. The motors for both drives were furnished by the Westinghouse Electric & Mfg. Company. The motors are enclosed in a housing, while the transformers and switchboards are located in small buildings outside of the furnace building, the wiring being carried in underground conduits. The mill building, also, is spanned by a 40-ton Morgan crane with a 15-ton auxiliary, which added to the floor-handling facilities afford a convenience and flexibility of movement that is expected to expedite greatly the mill operations.

The conveyor building, Fig. 12, through which the mill output is carried to the storage building is directly opposite the jobbing mill and its annealing furnaces. The conveyor building has a clearance of but 10 ft. under the bottom chord of the roof trusses and simply serves to house the two structural-frame, motor-driven, roller-table conveyors, one along each wall. At a distance of 20 ft. from the mill end, roller straighteners are inserted in each conveyor.

At the storage building end the conveyors extend out under the 40-ton crane which traverses that building, thus affording a very convenient means of delivery for the mill output. A blind shipping spur enters the storage building at the end near the conveyors so that heavy material can be loaded directly into cars at that point instead of passing through the warehouse in the usual way. At the end of one of the conveyors there is installed a splitting and guillotine-type shear furnished by the Wheeling Mold & Foundry Company, and used for trimming the sheets and shearing scrap.

Annealing, Galvanized and Storage

The annealing building connects the mill and storage buildings at a point opposite the sheet mills. This building is designed with a center bay 65 ft. wide and spanned by a 40-ton crane and two side bays each 35 ft. wide in which the annealing furnaces are located. There are five oil-burning furnaces on each side with space remaining for the installation of an additional four. The furnaces are 19 ft. 3 in. x 21 ft. 3 in. over all and are arranged to receive the sheets for annealing on trucks rolling on wide-gauge tracks that extend into the center bay under the crane. The crane runway in the annealing building extends 24 ft. into the mill building at one end and the same distance into the storage building at the other end and at a height which allows the cranes in these latter buildings to pass directly over the annealing building crane. In this way the crane loads can be transferred directly.

The galvanizing department occupies the east end of the storage building and in addition to the 40-ton crane which operates the entire length of the building is traversed by a 10-ton crane mounted on a runway under that of the larger crane and extending from the east end of the building to the annealing building crane runway.

This additional seven-pot department will be automatically operated to the greatest extent possible. With the exception of the cars of the industrial railway system connecting the pickling house with the galvanizing house, no trucks will be used. The annealed sheets are delivered into the annealing building by the crane on false bottoms so that the sheets are handled as box units by the cranes until required for galvanizing. From the floor where these units are placed alongside of the industrial track, the sheets, stripped off, are placed on edge in the pickling cradles which are carried on the cars. The cars will then run by gravity to the pickling house. The

pickler located in the center of the pickling house is a four-arm, high-type, steam-operated, Mesta machine. The center of the track is tangent to the arc in which the end to the pickler arms swing and the cradles filled with sheets can be lifted directly from cars. The rotation of the arm which carries the cradle filled with block sheets over the pickling tank, simultaneously loads the cradle full of pickled sheets out of the now empty car.

The return track to the galvanizing house is also a gravity track, and, in crossing the galvanizing building, runs alongside of six large storage tanks in which a reserved supply of pickled sheets may be accumulated. The galvanizing pots are located centrally in the building and the sheets are placed in the tanks at each pot from the crane by means of a special device developed to eliminate hand labor with a resultant saving in the actual running time of the galvanizing machine of about 5 per cent.

The galvanizing machines are driven by individual 15-hp., alternating-current, Westinghouse motors. Power is transmitted through the highest-range, variable Reeves drive, the galvanizing machine being driven from the variable shaft and the leveler from the constant shaft. These drives are equipped with an especially designed indicator for controlling and regulating the speed changes. After being carried through the galvanizing pots by the machine the sheets are conveyed on chain conveyors to a heavy-type leveler furnished by the United Engineering & Foundry Company. This leveler delivers the sheets on to a table where they are inspected and cooled. With the present equipment it will be possible to pickle a sheet of any gauge up to a maximum size of 56 in. x 14 ft. for special black finish and blue stock. The galvanizing machines and equipment will permit handling specifications covering material from No. 10 to No. 30 gauge inclusive, in widths up to 48 in. and lengths from 66 in. to 14 ft.

The ventilating arrangement in the pickling room is of particular interest and importance. Instead of having the gases and vapors from the tanks drawn off from the upper part of the room, thus causing a contamination of the atmosphere in which the operators work, the working floor is built of an open grating through which the gases are pulled down and out into a flue by a 48-in. fan located in the flue opening.

In the storage and warehouse buildings the construction has been of a character intended to protect to the greatest degree possible the highly finished steel stored therein, and a splendid steel-frame brick building is the result. The floor of the storage building is paved with paving brick and the floor of the warehouse bay is made of asphalt blocks laid on a bedding of 8 in. of concrete. In this bay the material is handled at present on an industrial railway system, but the building columns are arranged for the future installation of a 10-ton crane runway. A covered loading platform extends the length of the building from which material can be loaded directly into cars on the parallel loading track without exposure of the sheets to the weather.

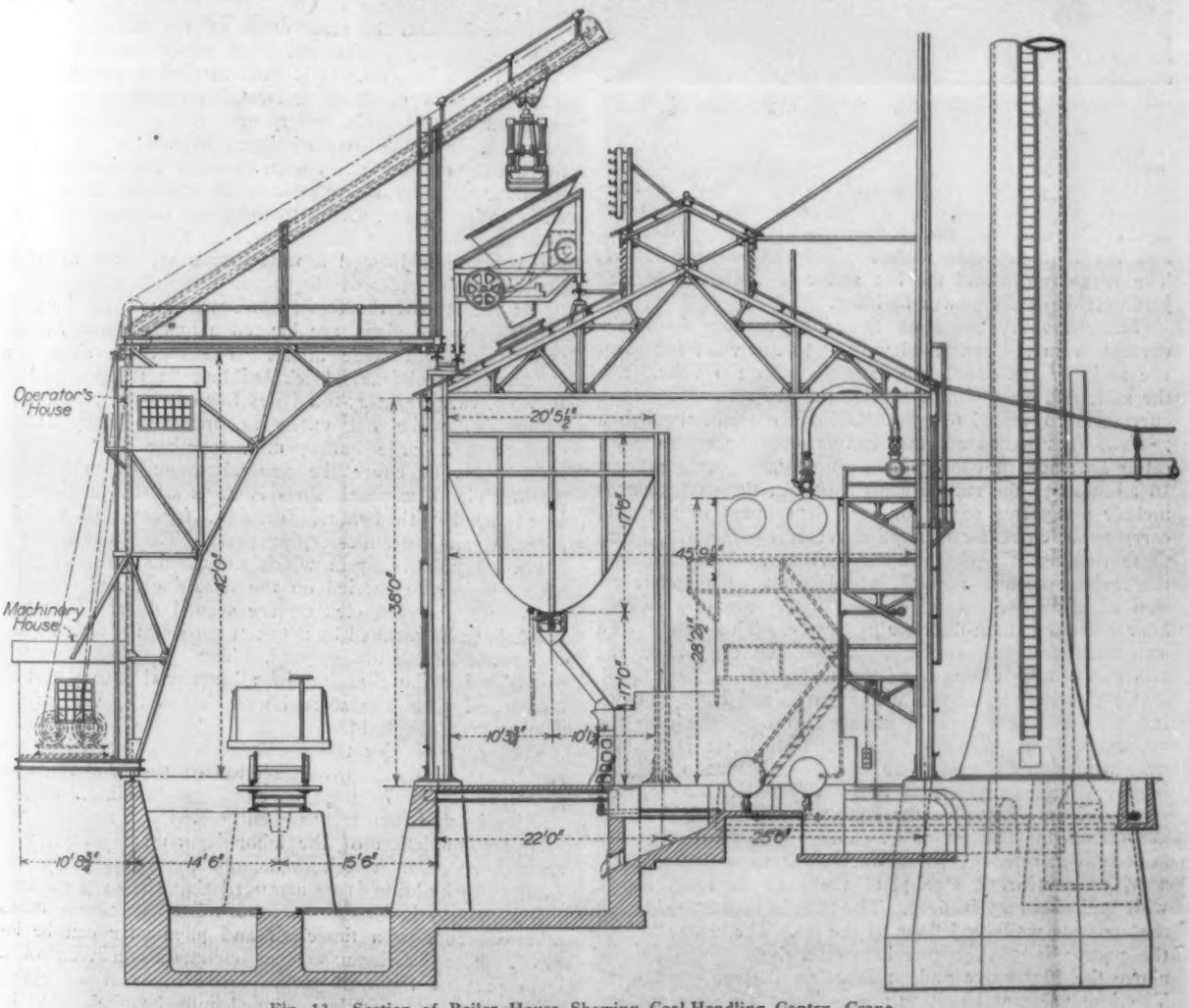


Fig. 13.—Section of Boiler House Showing Coal-Handling Gantry Crane.

The Power Plant

The electric power station is a Westinghouse installation throughout. The power building is an extension of the blooming-mill-engine building along the common-mill-building wall, as shown in the supplemental plate, and contains in addition to the generating station, the billet-mill engine and the mill-hydraulic pumps. It is 335 ft. long and 52 ft. wide and is served by a 40-ton Morgan crane. The pumps and condensing machinery are on the ground or mill-floor level; the generating units on a raised floor directly above. Electric power is developed by Westinghouse-Parsons turbo-generators of both high and low-pressure types. At present there are installed two 1500-kw., low-pressure sets, each developing three-phase, 25-cycle current at 2200 volts and one high-pressure set of the same capacity and rating. Provision is made for the installation of one additional low and one high-pressure set. The blooming-mill and billet-mill engines, which are run non-condensing, supply the steam for the low-pressure turbines through two 34-ton Sorge regenerators. The high-pressure steam is carried over

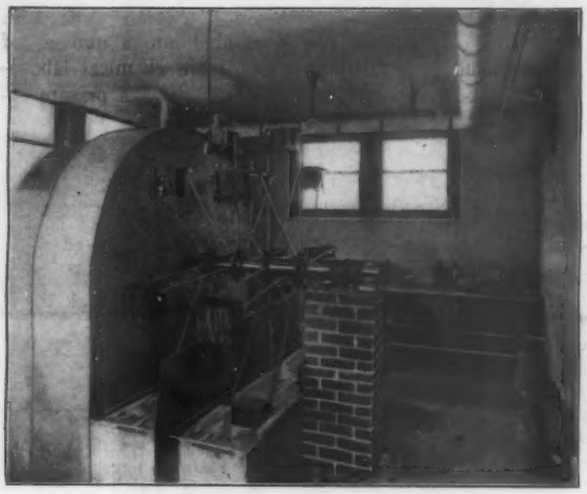


Fig. 14.—Corrosion Testing in Research Laboratory.

direct from the boilers. The steam lines are connected up so that the pressure of the exhaust steam may be augmented when necessary by live steam. The turbines are run condensing, the low pressure with No. 17 LeBlanc and the high pressure with No. 14 LeBlanc condensers. The regenerators and the hot and cold wells are located just outside of the power building.

Six stationary induction transformers step down the current from the generated voltage to 240 volts for plant use and six additional sets transform to 120 volts. For the table and crane-motor service the 120-volt, three-phase current is converted to 250-volt, direct current, through a 750-kw. Westinghouse rotary converter. The centrally located switchboard commands the generating-station floor. In addition to the station-control panels, the switchboards include a separate panel for each department of the mill, carrying a current-consumption-recording meter. From these readings the charges for current are made against the various departments. The leads for the plant distribution of current are carried directly up from the switchboards to the main-distributing tower. This tower is a structural-steel framework ingeniously built up from the mill and power-building-roof trusses.

Condensing and service water is obtained from a pumping station at the river a distance of 6000 ft. from the generating station. The pumping station pit is housed over with a brick building 20 x 49 ft. Two 20-in. Worthington volute pumps with a capacity of 18,000,000 gal., direct driven by 350-hp. three-phase motors at 450 r.p.m., are installed. The pit in which the pumps are placed is built of concrete, the forms for which were built around a ¼-in. reinforced steel-plate tank, 42 ft. long, 20 ft. wide and about 25 ft. deep. The tank is thus imbedded in the concrete walls and floor of the pit. The center line of the pumps is 5 ft. above low-water line, 10 ft. 8½ in. above the foot valve and 39 ft. below the mill-yard level. The foot valve and suction are 24 in. in diameter and the pump discharge is 20 in. Water is admitted from the river through a 7-ft. tunnel, passing a screen gate of ¼-in. mesh into the forebay from the bottom of which water is pumped through the foot valve.

Considerable attention has been paid to the design of the boiler house to the end that labor around the boilers be eliminated to the greatest extent possible. A cross section drawing of the boiler plant is shown in Fig. 13. The installation consists of ten stoker-feed, vertical, Rust boilers, spaced 12 ft. 11 in. between centers, each of 500 hp., affording an aggregate of 5000 hp. The building is of steel construction and the five 165-ft. stacks, one for each pair of boilers, are of self-supporting, steelplate type. The boilers are mounted on concrete footings with openings between so that the bottom drums and blow-off connections are readily accessible. Around the boilers platforms are built leading to all points where it is necessary for a man to go for cleaning the boilers or observing readings.

The boiler-house building is 47 ft. 6 in. wide and 266 ft. long. The clearance under the bottom chord of the roof trusses above the floor line is 38 ft. The location of the boiler plant in relation to the other buildings may be noted from the general plan, Fig. 1. The coal-handling arrangement provides for switching cars in on tracks at ground level over two concrete coal pockets, each 27 ft. wide, 12 ft. deep and having a combined length of 177 ft. These are immediately outside of the boiler house and have a total capacity of 1500 tons. Rails of 60-lb. section in 30-ft. lengths are imbedded in the bottom of the pockets. These pockets are spanned by an electrically operated gantry crane, carrying a 40-cu.-ft. grab bucket, which may be dropped into the coal pockets, raised and carried on an incline runway to the position indicated in Fig. 13, where the coal is discharged into a traveling scale hopper which operates along the roof of the boiler house. This hopper discharges through an opening in the roof into a steel parabolic type bin, having a capacity of 6 tons per lineal foot and extending the length of the building in front of the boilers. Through a foot valve and spout the coal is discharged into the several Roney stokers.

The ash from the grate drops off the bank end, down into a concrete, sloping pit, from which the ash is discharged into buggies. It is then carried to two ash pits, 9 x 13 ft. and 13 ft. deep, located centrally between the two coal pockets. The gantry grab bucket lifts them out into cars. The side of the building in front of the boilers for a height of 12 ft. is open between the columns, and the floor in front of the stokers for a width of nearly 15 ft. is entirely clear, giving to the plant an aspect of freedom and noteworthy cleanliness. At the west end of the boiler house is located a water-softening plant in which the Hoppes' system is employed.

At the end of the 66-ft. road, which will be the main entrance to the plant, are located a machine shop, blacksmith shop and store house. The machine shop is a substantial steel-frame brick building 82 ft. long and 90 ft. wide, carrying a 25-ton Niles-Bement-Pond crane. The equipment, while not extensive, includes heavy lathes, drills and a large boring mill, together with sufficient small tools to cover the general range of mill repair work. The blacksmith shop is 42 x 60 ft. in size and is equipped with heating furnaces, forges and a high-speed, steam-hydraulic-forging press. The store house is a two-story building in which miscellaneous small parts of all kinds are carried on the first floor, and electrical equipment, fixtures, etc., on the second floor. The store house is to be paralled by a 10-ton yard crane, which spans the stock and storage yard. The store-house system provides for the charging of all material into the store house and from the store house out to the various departments of the mill.

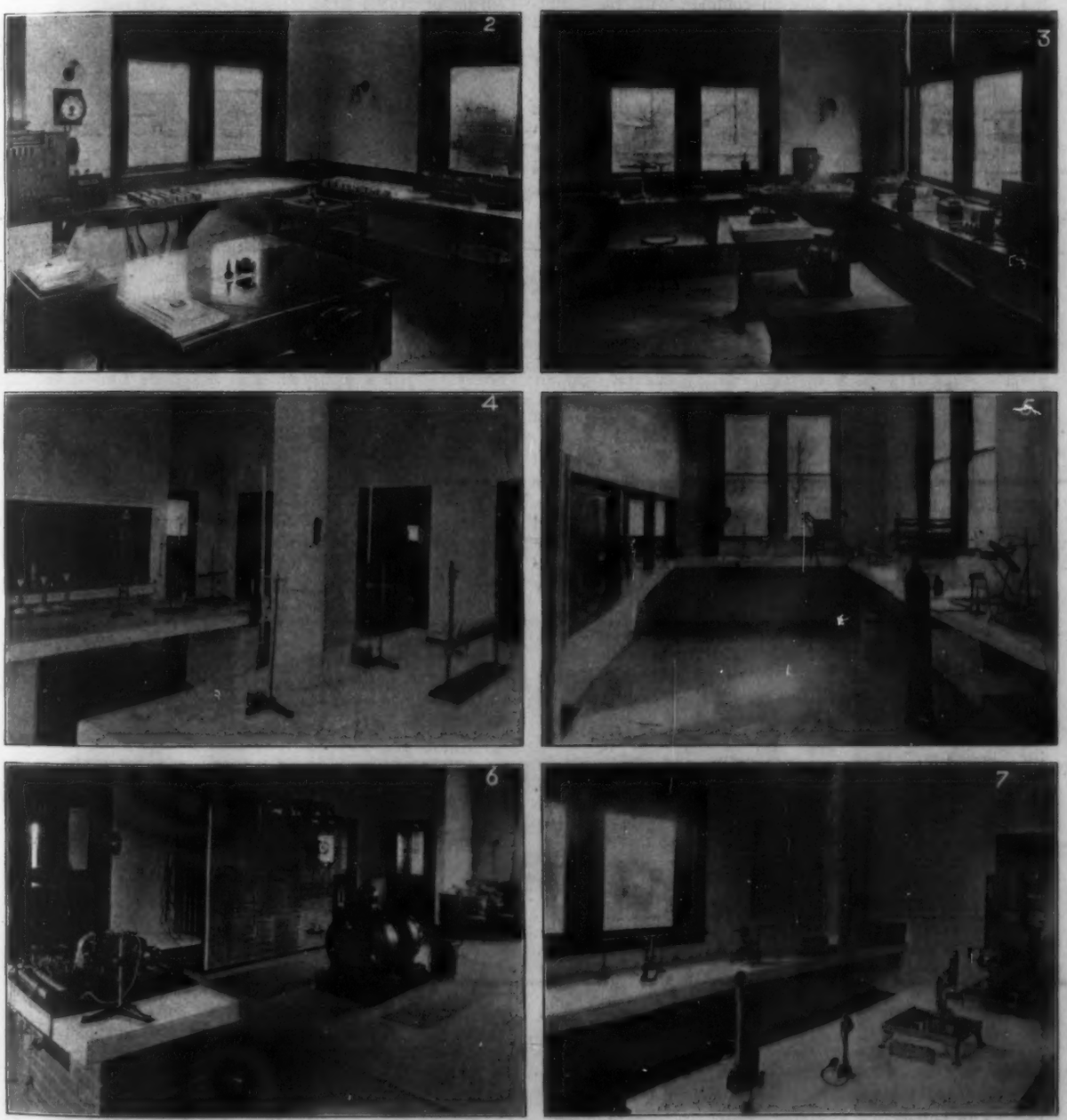
The entrance for the workmen is now located on the north line of the improved section of the property, at a point due north from the open-hearth building. An attractive brick structure has been erected and arranged for the accommodation of the labor-department offices, with an ante-room in which applicants for employment can wait. The building is so arranged that the only entrance for employees is directly in front of the gate-watchman's office where also a timeclerk and paymaster can be located. The watchman's office commands a view of a large part of the mill yard. Immediately opposite this building an extensively equipped mill hospital is to be erected, with an ambulance station to provide immediate and continuous service for the mill.

Fig. 15.—Physical Laboratory in Research Department Building.

The Research Laboratory

As a foundation for the development of the special qualities embodied in the product of these mills, the company has built and equipped a research laboratory of unusual excellence. This is not a mill laboratory but distinctly intended for experimental research and investigation. The effort of this company is directed toward the production of steels to meet special requirements and the laboratory equipment is designed to cover the development of improved properties in the steel for use in electrical, chemical and physical fields of service. The accompanying illustrations, Figs. 14, 15 and 16, clearly indicate the "precise" character of the instruments installed and the provision for nicety of experiment which has been carried to the greatest possible degree. The greater portion of the first floor of the building is devoted to investigations of an electrical character, including the testing of instruments and magnetic tests upon the steel, to establish the characteristics of the metals.

The metallurgical section of the laboratory occupies the entire second floor and is divided into a number of rooms including a distilling room, main chemical laboratory, balance room and microscopical room, a private research laboratory, a supply room and an office. In the basement a room is set apart for corrosion tests, and in addition to shelves on which jars are placed containing immersed specimens covering a wide variety of tests, an apparatus is set up as indicated in Fig. 14. This is a rotating shaft carrying radiating arms from which are suspended a number of sample sheets of steel, which, as the shaft intermittently revolves, are submerged in a trough and again removed to be exposed to atmospheric action. Tests with this device are conducted for a long period and with different solutions and actual conditions are approximated almost exactly. The department for physical tests, Fig. 15, is equipped, among other things, with a 100,000-lb. Riehle testing machine and a Landgraf-Turner alternating impact machine.



1.—Exterior of Building. 2.—Sheet Metal Testing Room. 3.—Standards Room. 4.—Main Chemical Laboratory. 5.—Private Research Laboratory. 6.—Main Electrical Laboratory. 7.—Microscopical Room.

FIG. 16.—VIEWS IN RESEARCH LABORATORY, AMERICAN ROLLING MILL COMPANY.

The Rolling of Automobile Rims

About 15,000 Tons of Steel So Used in 1910

The very rapid growth of a Cleveland, Ohio, electric welding company, the addition to whose rim manufacturing plant was recently described, calls attention to the extent of the automobile rim manufacturing industry and to the value attaching to these rims among the rolled steel products. It has only been in the course of development that the automobile factories have come to be manufacturing plants as distinguished from assembling shops, but even now scarcely an automobile company manufactures or controls the making of wheels, rims or tires. While one or two of the automobile wheel making concerns, such as the Kelsey Wheel Company at Detroit, and W. K. Prudden & Co. at Lansing, Mich., have undertaken the manufacture of rims, the development of steel rims has largely been through the rubber tire interests. The making of rubber tires has little in common with the manufacture of steel rims, and it came about that the actual manufacture of the steel rims was let out by contract. The Standard Welding Company at Cleveland was one of the first to engage in this work under such an arrangement, and at the present time this company manufactures all of the rims for the United Rim Company, through which the sale of rims is handled for the United States Tire Company, the B. F. Goodrich Company, the Diamond Rubber Company and the Goodyear Tire & Rubber Company. Within a year the Firestone Tire & Rubber Company has built a large plant exclusively devoted to the manufacture of its own rims. At Cleveland the Booth Rim Company, a $200,000 corporation, has built a $100,000 plant for the manufacture of automobile rims only, and these of a particular type. Several other rim companies are also in existence promoting the sale of special types.

The earlier forms of rims were of comparatively simple shape. For solid tires the ordinary channel was of cross section generally similar to the structural channel, while for pneumatic tires a rim with a simple rolled clinch was used. The general uniformity of section and its simplicity made this business desirable from the rolling mill standpoint, despite the comparatively small tonnage. The prohibitive cost of machining has confined the form taken by most types of rims to rolled shapes and drop-forged fastenings. The demand for greater convenience in changing tires has resulted in the development of quick-detachable and quick-detachable demountable rims. These new designs have increased the weight of the rims, and, together with the great increase in the number required to supply the growing demands of the industry, have even more rapidly augmented the steel tonnage involved. The cost per pound, on the other hand, increased greatly, for the newer types of rims comprised more parts and introduced new shapes and small sections. These sections are required to be rolled accurately as to gauge, inasmuch as the great danger of tires being thrown off the wheel while a car is in motion, necessitates the rims being rolled to exact sizes insuring a perfect fit. The further limitations with reference to weight and the necessity for using a fairly high carbon steel to preserve stiffness contributed to a higher cost. Facing the problem of frequent roll changes and the necessity for carrying many different kinds of rolls, the mills were slow to cooperate. As a result the rim manufacturers found it necessary to buy the rolls themselves on an arrangement with the mills whereby the cost of the rolls was refunded after the rolling of a certain minimum tonnage. One rim company has about $40,000 invested in rolls alone.

The rim steel is furnished by the mills to the rim manufacturer only in straight lengths. At the rim plants these pieces are cold rolled into circles. In addition to these rolls the rim plant must include electric welders, sizing and tire-setting machines and a Sherardizing plant, beside being a complete machine shop.

It is estimated that 200,000 pleasure cars and about 10,000 commercial vehicles were manufactured in 1910. The rims for these cars would vary in weight from 100 to 200 lb. per car. Assuming a reasonable average weight, an approximate estimate would place the weight of steel used for this purpose at 15,000 tons. The manufacturing cost of the rims made from this steel would approximate $2,500,000 and their value at the prices at which they passed into the hands of the automobile owner would be but little less than $5,000,000. As compared with other forms of rolled steel it is therefore interesting to know that for the more recent types of automobile rims, of which the proportion is rapidly increasing, the automobile-owning public is paying something over 30 cents per pound.

Heavy 15-Inch Engine Lathe

A Recent Product of Greaves, Klusman & Co.

A new addition to the line of lathes built by Greaves, Klusman & Co., Cook and Alfred streets, Cincinnati, Ohio, has been made in the shape of a heavy quick change 15-in. engine lathe. This new tool in common with the regular 15-in. engine lathe which was illustrated in *The Iron Age*, October 27, 1910, is adapted for all classes of work met with in manufacturing and repair shops and in tool rooms. It is also characterized by possessing ample power for heavy reduction work while at the same time it is quick and convenient in operating on lighter classes of pieces. Fig. 1 is a front view of the new tool, while an end view showing the gears with the guards removed is given in Fig. 2.

In the construction of the bed a very wide and deep box has been secured in which the twisting strains on the Vs are taken care of by heavy reinforcements. These extend the full length of the bed and also below the top of the girts. The side walls above the top of the girts are three times as thick as below. The carriage which is of extra heavy construction has full length bearings on each V and a wide flat one inside the front V, an arrangement which not only shortens the bridge of the carriage but also provides a substantial support directly under the

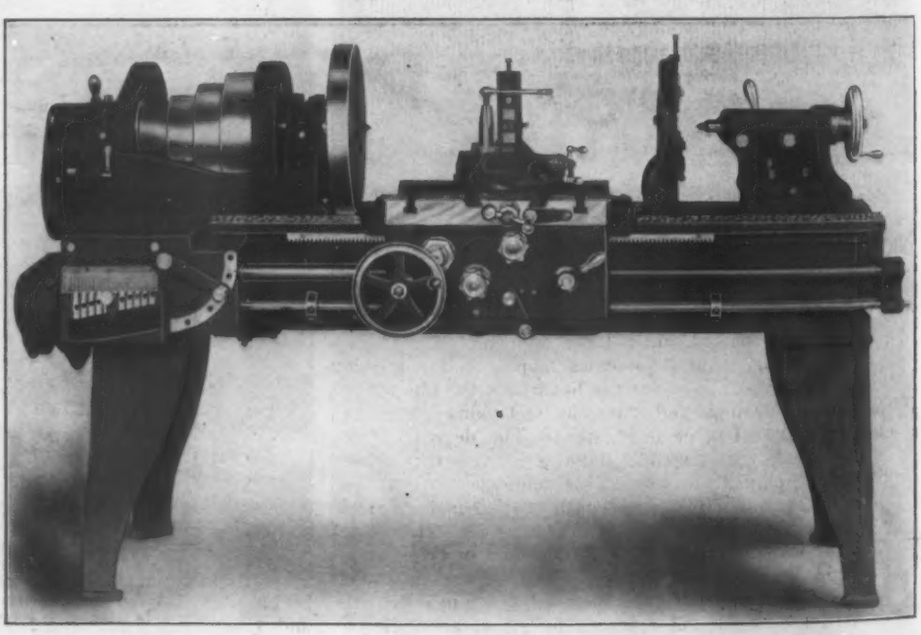


Fig. 1.—The New Heavy Quick-Change 15-in. Engine Lathe with 6-ft. Bed Built by Greaves, Klusman & Co., Cincinnati, Ohio.

tool rest. A compound clamp which is conveniently operated locks the carriage, the bridge of which is exceptionally wide and deep. The construction of the double plate box-type apron is very rigid. Bearings at each end are provided for the studs. The gears are of ample proportions and are cut from solid steel. The teeth are of coarse pitch and the strength is equal to the driving power of the lathe. The studs upon which these gears run are hardened and ground. Frictions operate the longitudinal and cross feeds which are reversed by the lever shown at the front of the apron and the feed rod and the lead screw cannot be engaged at the same time. The feed rod is supported at each end of the apron, thus maintaining alignment and relieving the bearings of all strain due to the sagging of the feed rod when the carriage is at either end of the bed. The compound rest is securely held at any angle by four locking bolts and is very substantial in its construction. The cross feed and top slides have taper

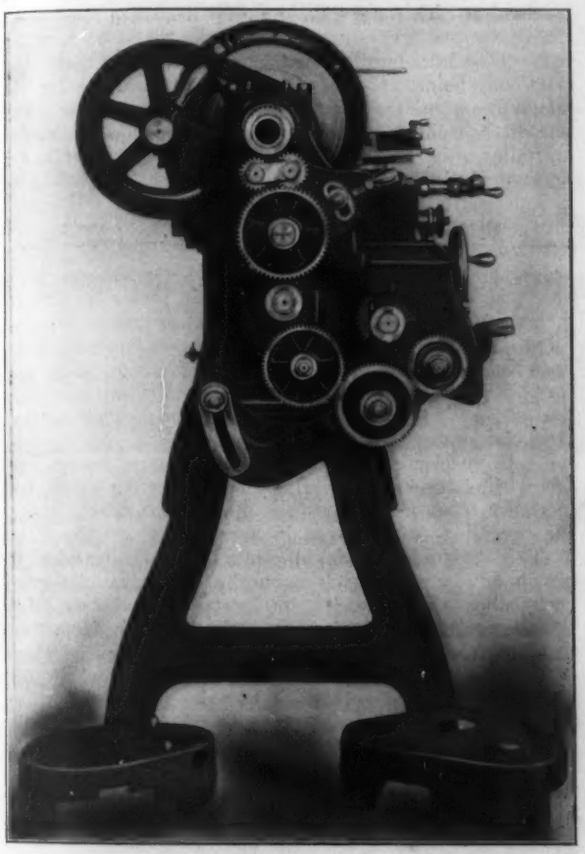


Fig. 2.—End View Showing Gears with Guards Removed.

gibs, and micrometer dials are fitted on the feed screws for these two parts.

Massive construction characterizes the headstock which is webbed throughout its entire length. The overhang of the tool when turning large diameters has been eliminated as far as possible by placing the center line of both the head and the tailstock back of the center line of the bed, an arrangement which permits a deep web between the headstock housings and a large diameter cone pulley, as shown in Fig. 2, and possesses ample driving power. High-carbon steel is used for the headstock spindle, which is accurately ground and runs in self-oiling phosphor bronze bearings of large dimensions. The design of the tailstock is such that a spindle one-third longer than those ordinarily employed is used. This telescopes through a thimble at the rear with a full length bearing in the barrel at the forward limit of its travel. Double plug clamps at both ends of the barrel grip the spindle and make it much more rigid than is the case with the ordinary tailstock. This double clamping device is operated by a single handle. If desired the compound rest can be set at an angle of 90 deg. when turning small diameter work, an arrangement which is made possible by the special shape of the tailstock. Three locking bolts secure the tailstock to the bed and set over screws and a graduated index are provided for taper work.

The lathe is fitted with a chasing dial for thread cutting which permits the thread to be caught at any point without reversing the lead screw. In this way both countershaft pulleys can run forward continuously, thus providing a wide range of speeds. All threads from 2 to 56, including an 11½ pipe thread, can be cut.

The following table gives the principal dimensions and specifications of the lathe:

Swing over bed, in.	16⅜
Swing over carriage, in.	11¼
Distance between centers, in.	36
Diameter of front spindle bearing, in.	2 13/16
Length of front spindle bearing, in.	4⅛
Diameter of rear spindle bearing, in.	2 5/16
Length of rear spindle bearing, in.	3⅛
Diameter of hole through spindle, in.	1 7/16
Number of cone pulley steps	4
Diameter of smallest cone pulley step, in.	4⅛
Diameter of largest cone pulley step, in.	10½
Face width of cone pulley steps, in.	2⅞
Width of driving belt, in.	2¾
Back gear ratio	12¾ to 1
Minimum spindle speed, r.p.m.	5
Maximum spindle speed, r.p.m.	475
Diameter of spindle nose, in.	2⅜
Length of spindle nose, in.	2
U. S. standard threads on spindle nose, per in.	6
Morse taper of center	No. 4
Diameter of tailstock spindle, in.	1 13/16
Length of tailstock spindle, in.	13¼
Traverse of tailstock spindle, in.	6½
Minimum number of threads cut, per inch	2
Maximum number of threads cut, per inch	56
Minimum feed per revolution of spindle, in.	0.00595
Maximum feed per revolution of spindle, in.	0.16667
Length of carriage, in.	24¾
Width of carriage bridge, in.	6½
Travel of compound rest, in.	4
Diameter of countershaft pulleys, in.	12
Width of belt, in.	3½
Minimum countershaft speed, r.p.m.	130
Maximum countershaft speed, r.p.m.	170
Size of tools taken, in.	⅝ x 1⅛
Weight of machine on skids, lb.	2,200
Weight of machine boxed, lb.	2,600
Contents of case, cu. ft.	80

The regular equipment furnished with the lathe includes compound, steady and follow rests; large and small face plates, a set of change gears, a countershaft with two self-oiling pulleys and hangers with ring self-oilers and wrenches. A plain rest can be substituted for the compound one if desired without additional cost. Other accessories which can be furnished with a slight additional cost include a taper attachment, a turret on the carriage or shears, an oil pan bed, oil pump and tubing and a draw-in collet attachment.

John W. Gates left an estate valued at between $30,000,000 and $40,000,000, according to ex-Justice Henry A. Gildersleeve. It includes stocks in the United States Realty Company, Texas Company, Republic Iron & Steel Company and other companies which he had promoted. Mr. Gates was also a heavy holder of United States Steel preferred. He had a large block of bonds of a Texas railroad, beside some Government bonds. The estate will be divided between his widow and his son, Charles G. Gates, but a number of bequests to relatives, friends and institutions were made, amounting to about $700,000.

The Burke Electric Company, Erie, Pa., has installed machinery and put in operation an extension to its plant 75 x 400 ft. The equipment includes a crane runway the length of the building, and two 50-ton cranes with 35-ft. lifts. At present the building is being used for light work, but it is the purpose of the company eventually to make this the machine shop for heavy castings. It practically doubles the capacity of the plant, which had been augmented earlier in the year by eliminating the power plant and utilizing the space in the old works to increase the capacity of the machine shop and transformer departments. Power is purchased and individual motors are being installed to operate the machine tools. Last week the company awarded contracts for a duplicate of the latest extension, which will, of course, further increase the capacity of the machine shop.

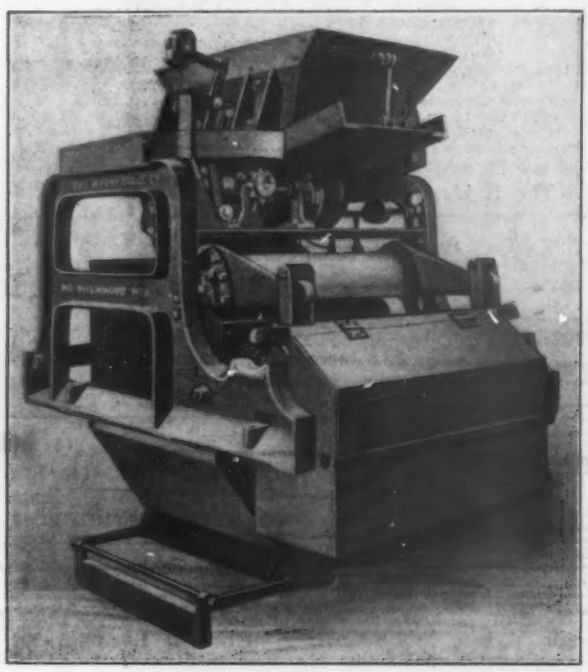
The Steel Car Forge Company, Frick Building, Pittsburgh, Pa., with works at Ellwood City, Pa., Butler, Pa., and Hammond, Ind., is making a specialty of designing forgings to take the place of castings, where it is found that a casting will not give satisfactory service. This has been successfully done in a number of instances, and the company's engineers are willing to give their services to manufacturers who may find it desirable to substitute a forging for a casting.

Avery Automatic Scale

A Coal Weighing Machine with a Patented Feeding Device

For weighing the coal supplied to the different units in a boiler house automatically the Avery Scale Company, Milwaukee, Wis., has developed a scale which is designed to be installed beneath the coal bunker and weigh the coal as it passes by gravity from the bunker to the mechanical stoker. The special features of the machine are ability to handle all grades of coal used in this country, the use of a patented feeding device and the employment of an even arm beam in its construction.

It is claimed for this scale that it will handle soft coal having a large percentage of moisture equally as well as the dryest anthracite or any of the intermediate grades. The feeding device is in the form of an oscillated tray moved forward and back by a crank. In this way it is possible for the feeding device to clear itself automatically by the shaking action which delivers the coal to the desired point. The operation of the feeding device is controlled by a clutch which is actuated by the motion of the weigh beam. This arrangement makes it impossible for coal to be delivered to the weigh hopper while the latter is discharging. In addition it is also possible for the scale to deliver coal to the spouts feeding the automatic stoker until the former are filled, when it will cease working until sufficient fuel has been removed to clear the scale outlet.



An Automatic Scale for Weighing Coal in Boiler Houses Built by the Avery Scale Company, Milwaukee, Wis.

The even arm beam employed in this scale is double-sided and has six knife edges arranged in pairs at the center and each end. The central pair forms the fulcrum of the beam and is supported by steel bearings, which in turn are attached to the main frames of the scale. The weigh hopper having a bottom discharge is suspended from one end of the beam while a weight box in which standard scale weights are placed is hung from the other. These two parts of the scale are suspended from the knife edges of the weigh beam by steel bearings of the same section as those placed under the beam fulcrum. When the box and the hopper are empty they are exactly balanced so that no compensation for the weight of the beam is necessary in placing the weights in the weight box. In this way when the coal in the weigh hopper balances the weights in the weight box an equal weight is assured without having to check it on another scale. In addition to the beam, the weight box and the weigh hopper there are the other necessary mechanisms for feeding the coal to the weigh hopper and discharging it after the desired amount has been weighed. The weigh beam controls both of these mechanisms although none of the parts are directly connected to the beam, which leaves the latter free to do its work at the proper time.

In operation the placing of weights in the weight box has a tendency to cause that end of the beam to descend, but a projection on the inlet mechanism restrains it. This contact imparts an upward pressure to this projection which is counteracted by an ordinary type of toggle joint. To start the machine it is simply necessary to break the toggle which enables the weights in the weight box to exert an upward pressure and start the inlet mechanism. This causes coal to pass to the weigh hopper, but before the desired amount has been passed the weight of the inlet mechanism is removed from the weigh beam and supported by a trigger. When the desired amount is in the weigh hopper that end of the beam descends and in its movement pulls aside the trigger supporting the inlet mechanism. This stops the delivery of coal to the hopper. There are two levers connected to the toggle joint which prevent the inlet mechanism from operating and these drop with the point as the trigger is pulled aside by the weigh beam in its descent. As these levers move down one of them liberates the toggle joint on the weigh hopper and allows the coal which rests on the outlet door at the bottom of the hopper to force the door open and discharge itself. As soon as the hopper is completely emptied the balance weight brings the door back to its original position as well as the toggle joint. In its movement the projection on the toggle joint strikes the same lever which opens the weigh hopper door and again places the feeding mechanism in service. While the weigh hopper is being filled the toggle joint on it is locked, thus preventing the door from opening while the weigh hopper is filling and there is a toggle joint attached to the inlet mechanism to prevent coal from being delivered to the hopper while it is discharging. On the larger machines the projection on the inlet mechanism which the weigh beams makes contact with is fitted with a spring and permits the weight box to return to its normal position quietly, but does not alter the operation of the scale in any way.

This scale adds to the efficiency of the boiler plant by giving an accurate check upon the coal consumption of each boiler. These scales are located immediately below the storage bunkers and a connection is made from them to the mechanical stokers by spouts that are either single or bifurcated, according to the number of stokers employed. If desired a machine of this character can also be used to weigh the coal as it is taken into the power plant or for knowing the amount of coal delivered at any fixed point. These scales can be equipped with a totalizing device for weighing, registering, totaling and counting the loads handled by the scale without any assistance. These scales are made in capacities ranging from 100 to 6000 lb., and for discharging their contents once each minute, although the speed can be set to suit the conditions under which each individual machine operates.

The United States Motor Company's Output

The United States Motor Company, whose main office is at Broadway and Sixty-first street, New York, with factories at Tarrytown, N. Y.; New Castle, Ind.; Providence, R. I.; Dayton, Ohio; Hartford, Conn.; Detroit, Mich., and Newark, N. J., produced in the 1911 season ended July 31 approximately 27,000 motor cars. For 1912 it is proposed to make 15,000 to 20,000 Maxwell cars, 10,000 to 15,000 Brush cars, 4000 to 6000 Stoddard-Dayton cars, 1000 Columbia cars, and 2000 Sampson trucks. President Benjamin Briscoe believes that, of the large American production of motor cars expected for the coming year, the major portion will be made by a comparatively small number of big producers, while the cars that will sell best are certain to be those of reputation that supply ample power and modern style at low prices. He further says that the automobile business is now down to a basis of stability that averages with any other business dealing in staple articles. His reports from the company's 1800 dealers in the various towns and cities indicate an active and steady demand for its products, the same as for other manufactured articles. In no previous year at this time has the company had so many orders on its books for immediate delivery.

Brown & Sharpe Castellating Attachment

For taking hexagonal nuts as they are cut from the bar and finishing them completely in one machine instead of employing a special machine for castellating them, the Brown & Sharpe Mfg. Company, Providence, R. I., has recently developed an attachment for use on its No. 2 automatic screw machine. This attachment is used for producing the lock nuts required on automobiles and other machines. Appreciable savings in the amount of time and labor required for this operation are effected by the use of this attachment, as a nut can be castellated while the slot is being milled and the blank indexes one-sixth of a revolution. It has been found that the time required for making the nut in the machine itself is ample for the sawing and the indexing. Figs. 1 and 2 give front and rear views of the attachment respectively.

The mechanism is compact and consists of a set of three saws for slotting the nuts, an indexing mechanism for locating the blanks in the proper positions for the slotting, a feeding mechanism for the cutters and a transferring arm for taking the nuts as they are cut from the bar and carrying them to the attachment. The cam shaft of the machine drives the mechanism, with the exception of the saws, which are driven directly by a belt from overhead. When it is desired to use the machine for other work, it is possible to remove the attachment easily and replace it as readily when more blanks are to be operated upon.

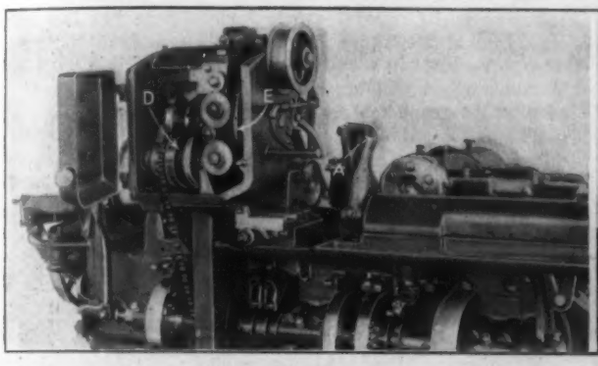


Fig. 1.—Front View.

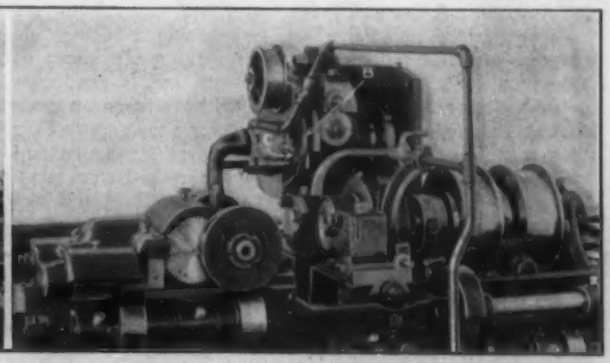


Fig. 2.—Rear View.

Two Views of the New Castellating Attachment for Lock Nuts Made by the Brown & Sharpe Mfg. Company, Providence, R. I.

The nuts to be castellated are inserted in bushings held in a magazine plate fastened to a sleeve on the main spindle of the attachment. There are six bushings in the plate, and these vary in size with the different sizes of blanks accommodated, the limits being 9/16 in. across the flats and 3/8 in. in thickness, and 7/8 in. across flats and 5/8 in. in thickness, respectively. As the nut is cut from the bar, it is taken by the transferring arm A, Fig. 1, and swung to a position opposite one of the bushings in the magazine plate B, Fig. 2. When the arm swings into this position a flat spring, C, rotates the nut so that its position is correct in relation to the hole in the bushing of the plate. The arm then moves forward until the small pin that extends radially from the stud upon which the nut is carried, comes in contact with its stop.

The arrangement for carrying the nut consists of a stud inserted in a bushing and forced forward by a spiral spring. As the pin reaches the stop, the bushing is forced further forward by the arm. When the nut carried on the end of the stud is pushed off into the hexagonal hole in the bushing in the plate, it simultaneously pushes a finished one out at the back of the plate bushing. When this has been done, the mechanism indexes and the plate is moved to one-sixth of a complete revolution, which brings the nut in position to be slotted by the first cutter.

While this operation is being performed, the transferring arm is inserting another nut into the next hole in the bushing. The mechanism indexes a second time and the first nut is moved to a position midway between the first and the second cutters. The next indexing moves the plate one-sixth of a revolution further, or one-third in all, and brings the first nut in a position to be cut by the second cutter. Two more movements place it where the third cutter can operate, and at the completion of the next indexing movement, this nut is ejected from the plate at the starting point, by the insertion of a new one.

The indexing and feeding mechanism is driven by a chain and sprocket, shown at the left of Fig. 1. A segment of a gear mounted upon the shaft driven by the chain constitutes the indexing mechanism and each time this segment revolves the teeth mesh with a gear on the main spindle sleeve. The engagement of these gears moves the plate holding the nuts one-sixth of a revolution and when this movement has been made the cylindrical cam D on the sprocket wheel shaft feeds the geared head carrying the cutters forward, the plate holding the nuts being positively locked in position while this is being done. A pressure plate, E, is mounted on the geared head and holds the nuts securely in place while they are being slotted. This plate has three slight projections which bear upon the nuts as they are being operated upon by the cutters which extend through slots in this plate. The pressure plate is held firmly against the nuts by springs that automatically compensate for any variation in the nuts due to the amount of burr left by the cutting-off operation.

This attachment was given a thorough trial in the maker's shop before being placed on the market and an output of 1000 nuts per day has been secured from the saws that run for 10 days without being ground.

Electrolytic Generation of Oxygen and Hydrogen.—The American Oxhydric Company, Milwaukee, Wis., calls attention to an erroneous statement which appeared in *The Iron Age* of August 17 relative to the recent introduction in this country of the electrolytic generation of oxygen and hydrogen. The electrolytic generation of these gases has been done for some years by the American Oxhydric Company, which is the sole owner of the L'Oxhydrique Internationale patents for the United States and Canada and also manufactures apparatus for the cutting and welding of metals.

The Schuylkill Pipe & Mfg. Company, Conshohocken, Pa., has leased No. 1 mill of the Longmead Iron Works of that city, and will place it in immediate operation on the manufacture of both iron and steel pipe in sizes ⅛ to 1¼ in. The new company is capitalized at $60,000 and expects to make from 8000 to 10,000 tons of pipe annually. The officers of the new company are: Nelson C. Gressman, president; Abel Thomas, treasurer; Herman J. Kleinman, secretary, and John W. Moon, superintendent.

The condition of iron in lime concrete after a period of more than 200 years was determined when an opening was made recently in the concrete of the dome of St. Paul's Cathedral, London. A large chain used for reinforcement at the base of the dome was found to be as bright and perfect as when new. One reason advanced in explanation of the condition is that the oxide of iron chemically combines with the cement, forming a covering of ferrite of calcium, which is a protective agent.

Referring to the business recently before the British rail manufacturers the London Ironmonger says that inquiries include 20,000 tons for Siam, 31,000 tons for West Australia, 6500 tons for New South Wales, and 21,000 tons for Victoria. The order for 6000 to 7000 tons of 50 and 80-lb. rails for South Australia has gone to the Barrow Hematite Company.

Lake Iron Ore Property Values Keep Up

General Mining News

DULUTH, MINN., August 26, 1911.—While there is little indication of increased activity in mining throughout the Lake Superior region, there seems no especial diminution in the value of iron ore properties, as expressed by sales. Recently a sale of some 40,000,000 tons of lean, non-Bessemer ores on the western Mesaba was made at $6,000,000, or 15 cents a ton in the ground. This was for the fee to an ore deposit that will not become available for some years and will then be mined under a considerable thickness of soil and rock. For the class of ore and its availability, this sale is probably at as high a price as has been paid at any time. To be sure, blocks of ore, whatever their grades, are getting hard to buy on the Mesaba, especially in fee. It is quite likely that interest charges will have doubled the cost of this ore body before it can be mined.

Old ranges are exceedingly quiet, especially at properties operated by the Oliver Iron Mining Company. Other operators, as the Cleveland-Cliffs Company, the Breitungs, M. A. Hanna & Co. and a few more, are busier. But the Schlesinger Newport mine, which produces a high grade Gogebic ore, has reduced its force from a maximum of 1700 men early this year to about 500, and is producing correspondingly. The Breitung mines have taken on more than 450 men during the season and have now more than 1200 men busy at their various mines at Negaunee and Humboldt. At the latter point they have the Baron mine, idle for many long years until 1909, and then reopened and rehabilitated.

The Cleveland-Cliffs Company is making a very large and important mine out of its North Lake and is adding to its force there, while it is employing the usual number at its Negaunee, Ishpeming and Swanzey mines. The North Lake will next year cut quite a figure in production and can maintain a really big output for a long time. It is one of the new developments in which the Cleveland-Cliffs Company has been so active for some years. Another active property in the Cascade region is the old Volunteer, belonging to T. F. Cole and associates, which is working 200 men. This, while some reduction from previous anticipations, is the largest force that has been employed since resumption took place under Mr. Cole's new company two years ago. The mine will not make any especial effort to ship a large tonnage this year, but is blocking out ore and doing a large amount of development work for the future. The Volunteer is unique for its region in that it is a producer of high grade Bessemer ore, and some of this class of material is being sent forward this season.

One of the idlest of idle mines in the Lake Superior region has been the Champion, west of Ishpeming. But here extensive development is about to take place. This mine now enjoys the distinction of being the deepest iron ore property on Lake Superior and of having a shaft that, for a small part of its descent, has been developed as a corkscrew. The Champion is now 2000 ft. deep and its No. 7 shaft will be sunk 80 ft. more. This shaft changes its bearing some 44 deg. in a distance of 175 ft., just below the nineteenth level, it being the only example of that sort of thing in the Lake Superior region. The change was made to accommodate the shaft to a change in the dip of the vein and has been very successful in its operation.

J. R. Finlay and his associates in the investigation of the value of mining properties in Michigan, for the benefit of the State Tax Commission, have completed their work and filed their report. Had it not been for the co-operation of the mining companies, speaking generally, it would have been impossible for the engineers to complete their investigations in time for the session of the commission, for the work was a very great one and covered nearly 200 mining properties of various classes and minerals. It is understood that, almost without important exception, the mining companies met the engineers with open books and freely gave the desired information.

Explorations

There is still much exploration in the Iron River district and in other parts of the Menominee range. There are many old mines there, worked years ago and long abandoned, that look very promising and that would, if they were in some other parts of the Lake Superior region, be immediately investigated in a most thorough manner. Several mines have been brought in in this district in the past year or two and that there will be more, as the work now in progress draws to its conclusion, is quite probable. The conservatism of reports as to new mining ventures, emanating from the Menominee region, are in marked and refreshing contrast with those that come from the Vermillion. Some weeks ago a writer, inspired by the spirit of prophesy if by no other, gravely predicted that there were four new assured shipping mines next year on the Vermillion, three more "probable" and another four "promising." This sounds like a classification of ore tonnages and would be important if the writer knew anything about the facts. It is to be regretted that the only information investors in the stocks of many of these companies get is this sort of thing.

Some years ago F. H. Clergue, acting under the advice and direction of Raphael Pumpelly, sank the deepest drill hole on Lake Superior, in the Republic fold, near Marquette. The hole served its purpose, which was to give information as to formations at depth, but on account of the later difficulties in which Mr. Clergue's companies found themselves the information thus gained was not followed to its natural conclusion. There has just been organized at Negaunee the 46-30 Mineral Land Company to explore lands in the immediate vicinity of this old work, and operations will begin at once on the most promising of the 1400 acres held by this concern. These lands cover a distance of about three miles along the strike of the mineral bearing formation, and between portions of the lands are three sections that are now under exploration by the Oliver Iron Mining Company. J. P. Channing and Raphael Pumpelly are both very pronounced in the belief that merchantable ore is liable to exist on these lands, and the new company starts its operations with the good wishes of all mining men in the region.

More Ore Found in Gogebic Mines

MARQUETTE, MICH., August 27, 1911.—It is stated that at the Tilden and the Anvil mines on the Gogebic range deposits have been found which add greatly to the lives of the properties. The Tilden is directly south of the city of Bessemer and is controlled by the United States Steel Corporation. The Anvil is in Section 14, 47-46, east of the Tilden, and is operated by Ferdinand Schlesinger, of Milwaukee. The peculiarity of the geological formation of the Gogebic range is the presence of dykes of diorite, each holding its quota of ore. These dykes extend to very considerable depth and are of varied thickness, in some localities hundreds of feet. At Ferdinand Schlesinger's Newport mine the great ore body now being mined 2200 ft. under ground was not encountered until 1000 ft. of barren rock had been penetrated. The contrary was the experience at the Steel Corporation's Norrie property. Within 1500 ft. from the surface at the Norrie no less than six dykes were found. Both the Tilden and the Anvil, it appears, have found their new deposits at considerable depth, the former down 1500 ft. and the latter down 1800 ft. The Tilden, now operated by Corrigan, McKinney & Co., of Cleveland, formerly was one of the largest shippers of the range. The discovery of the new ore body means increased production. Much of the deposit, it is said, extends beneath the city of Bessemer. This fact is immaterial, however, for with 1500 ft. of rock intervening there will be no disturbance of the surface as the ore is taken out. The Anvil mine, although opened a quarter of a century ago, has been a small property. It has not been operated steadily and all told has produced only 750,000 tons. The Yale mine of the Lake Superior Iron & Chemical Company in Section 16 east of the Anvil is opening a new deposit at a depth of 1800 ft. and will prove a much better property than appeared likely a few years ago. Moreover, a number of new mines are in course of development on the Gogebic range. In fact there is reason for the statement that all three of the Michigan ranges—the Marquette, Menominee and Gogebic—are still a long way from attaining the zenith of their careers.

Greater Prospects of Marquette and Menominee Mines

In the Negaunee field of the Marquette range—the oldest in the Lake Superior region, its first mine having been opened more than six decades ago—there is asserted to be more ore in sight or known to exist than has yet been shipped. At Ishpeming three miles west, where some of the biggest mines of the region are located, the deposits

will not be exhausted half a century hence, according to the estimates of authorities. In the territory directly west of Ishpeming two large new mines are being developed, diamond drills have located other prospective producers and there is much land yet to explore. The Humboldt, Champion and Michigamme fields still to the westward and the Republic fold to the south all hold much of promise.

On the Menominee range the developments the past few years have been of great importance. New deposits aggregating millions of tons have been located in the Iron River district and it is not doubted that many more millions will be found within the next decade. In the Crystal Falls field, the old mines not only have more extensive reserves than at any time, but the diamond drills at work on undeveloped tracts are gradually adding to the number of future producers, the most notable recent cases of this kind being the success of M. A. Hanna & Co. at the Ravenna and Monongahela properties in Section 19, 43-32 and Section 36, 43-33, respectively. The Iron Mountain and Norway districts of the Menominee both possess large mines which will be active many years yet; the Florence field holds more ore than surmised some years ago, and there have been important discoveries in the Randville country.

The old ranges do not contain great, wide beds of ore capable of being mined by the steam shovel as does the Mesaba. Neither do they produce such tremenduos tonnages. Their deposits lie at much greater depth and must be mined wholly by underground systems—a much slower work, and for that reason the old ranges may be active long after the Mesaba has become exhausted.

The Krupp Research and Chemical Laboratories

In the issue of Stahl und Eisen of June 1, 1911, a profusely illustrated article was printed describing the new laboratories of Fried. Krupp, at Essen, Germany. These laboratories embrace not only those for the ordinary chemical work of the plant but very well equipped ones for chemical, metallurgical and physical research. The laboratories were started as long ago as 1863, were very largely extended in 1883, and in 1895 a special building was found necessary for physical testing. In connection with this latter laboratory, four years later, the first microscopic laboratory in Germany was instituted. The chemical laboratories in 1910 made 476,728 estimations.

The present magnificent new structure housing all these departments consists of a main building with two large side wings, covering a ground surface of 39,127 sq. ft. The total floor space is 118,400 sq. ft. Architects' drawings are given of the various floors, showing the arrangement of the rooms, and the purposes for which they are intended are carefully described in the article.

The northern wing is entirely occupied by the chemical laboratories, in which the following divisions are observed: A—steel analysis; B—special products, ore, etc.; C—gas, water analysis, etc.; D—oil testing; E—powder testing.

The chemical-physical testing laboratories are divided into chemical and physical divisions. The main chemical laboratories previously described are for the routine work, while these are for the special steels, etc. The physical division embraces metallographic testing, metallurgical testing, and physical testing proper. The very complete equipment of these various departments is given in detail and is as thorough as would be expected for this, the foremost of German steel companies. G. B. W.

The International Flux Company, manufacturer of Keystone thermal and basic flux for foundry use, is planning the erection of a large factory, to be well equipped for the manufacture and compounding of its different fluxes. Evansville, Ind., has been selected because of its excellent location for shipping. The company's mines are in Hardin County, Ill., within easy reach of Evansville, which is situated on the Ohio River and on the Big Four, Louisville & Nashville and other railroads, and is in the immediate vicinity of excellent deposits of coal. The president of the company, M. Jewett, in 1910 acquired patent rights in this country on a method for the melting and cleansing of iron and brass, which is claimed to be of great importance in cupola practice.

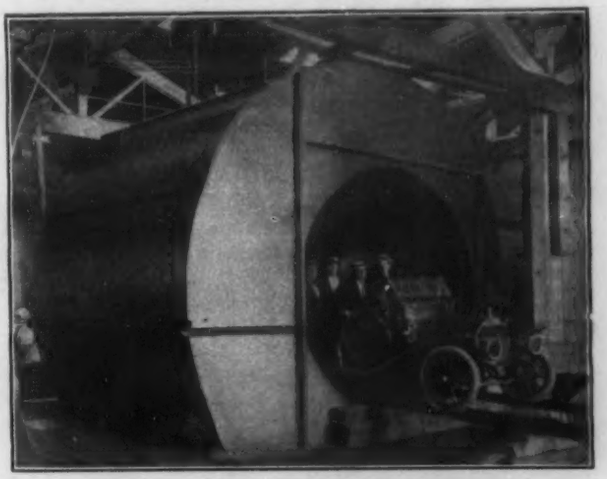
Notable Tunnel Ventilating Plant

Air Moved Faster than Trains Under Baltimore

The Pennsylvania Railroad Company is installing a large ventilating plant in one of the tunnels under Baltimore. The tunnel has a length of 4963 ft., with a cross sectional area of 432 sq. ft. The crown of the tunnel is 19 ft. high above the rails at the portals and the cubic feet of space from end to end amounts to 2,150,000. Above one of the portals is located a fan room measuring about 30 x 36 ft and 16½ ft. in height. The floor of the room is about 28 ft. above the tracks.

In this fan room are two Sirocco fans, each measuring no less than 15½ ft. high above the floor, 18 ft. in length and 14 ft. in width, together with electric motors and driving mechanism for transmitting the power from the motors to the fans. Some idea of the size of the fans may be gained from the photograph taken in the shops while the fans were under construction. The photograph shows an automobile in one of the inlets, which latter is 11½ ft. in diameter. On the other side of this fan is another inlet of the same size.

Both of the fans have outlets 8½ x 14 ft. which discharge downward through the floor into a chamber surrounding the upper part of the tunnel, the air being discharged from the chamber through a long tapering nozzle carried around the entire perimeter of the tunnel above the tracks in such a way as to direct the flow of air forward much the same as it would from an injector. Only



One of the Sirocco Ventilating Fans.

one of these fans is intended to be run at the same time, the other being held in reserve for use in case of accident.

It was determined that the tunnel would require 450,000 cu. ft. of air per minute. This volume will produce a velocity through the tunnel of 1040 ft. per minute. When a train is going through the tunnel in the same direction as the air current, the available area for the passage of air being so greatly reduced causes the air to travel faster than the train; hence it is held that any smoke from the locomotive is pushed before the train fast enough to give the engineer a clear view of the tracks.

Charles S. Churchill, chief engineer of the Norfolk & Western Railway Company, Roanoke, Va., designed the plant. Previous to the installation of the ventilating plant of his design at the Elkhorn tunnel at Coaldale, W. Va., on the Norfolk & Western Railroad, it required 17 to 55 min. to clear the tunnel of smoke; the temperature inside the tunnel was about 3 deg. higher than the outside temperature after a train had passed and during the four years immediately preceding the installation of the ventilating plant twenty-six men were asphyxiated in the tunnel. After the installation of the ventilating plant smoke would appear at the portal ahead of an engine 2 min. before the train appeared and in less than a minute after the engine had passed out the steam had vanished from the roof where it usually clings persistently. The installation of this ventilating plant made it possible to increase the load of east-bound trains about 100 tons, saving four east-bound trains per day on a run of 11 mi., or a saving above the cost of operation of about $1446 per month.

S. DIESCHER & SONS.
Mechanical and Civil Engineers,
PITTSBURGH, PA.

The Machinery Markets

With the exception of Chicago, where the demand for heavy equipment is good, the machinery-selling centers of the country are experiencing a very dull summer period. Pending purchases of machinery for a technical school are occupying the attention of the Cleveland dealers. In New York and Philadelphia the outlook is good on account of a number of inquiries for two and three-tool propositions, which in the aggregate will make a large amount of business when closed. The market is more quiet in Detroit, and the outlook there is not so cheerful except in power equipment and electrical machinery, for which the demand continues good. Texas is still a good market for irrigating machinery, but Mexico is not expected to give much business until after the presidential election in October. The European export demand is the one redeeming feature of the week's trade.

New York

NEW YORK, August 30, 1911.

Current business with the machinery houses so far as actual orders are concerned has been less active this week than early in the month. The outlook is very good, however, and judging from the number of inquiries, the majority of which are for two and three-tool propositions, the next 30 days should prove an unusually good month. Western promoters of hydraulic enterprises are placing a large share of their orders for water wheels and kindred equipment with New York houses handling those lines. With the exception of the Delaware & Hudson and the Delaware, Lackawanna & Western railroads, which are inquiring for a few single tools, the railroads are practically out of the market. The export trade is still holding up well.

The United Rubber Company, 5 Nassau street, New York, has been incorporated with $100,000 capital stock. The incorporators include A. A. Sands, E. C. Baker, Frank B. Vermilya. The affairs of the company are in the hands of Mr Vermilya.

The Harrold Mfg. Company, 393 High street, Newark, N. J., has had plans prepared for a new plant for the manufacture of paints and varnishes. Details as to equipment will be given as soon as a suitable site is selected.

The Cosmos Rubber Company, a New York corporation, has taken over the old plant of the Trenton Bone Fertilizer Company, Trenton, N. J., and will equip it for the manufacture of rubber specialties. The company will employ about fifty people.

The Zahm Mfg. Company, Buffalo, N. Y., has been incorporated with a capital stock of $50,000 to manufacture filtration and sterilization machinery for brewers', distillers' and manufacturing chemists' uses. A site for the manufacturing plant has been secured. The incorporators are E. Zahm, C. A. Strangmann and J. F. Nagel. Present offices, 988 Main street

The Jamestown Woodfinishing Company, Jamestown, N Y., recently incorporated with a capital stock of $50,000, is building a two-story factory at Blackstone and Driving Park avenues, on the Erie Railroad, East Jamestown, where fillers and stains for wood and metal furniture will be made. Ambrose E. Smith, of Olean, N. Y., is president of the company, and John Dahlquist, Jamestown, vice-president and secretary.

The J. & D. D. Miller Company has been incorporated at Binghamton, N. Y., with a capital stock of $100,000, to manufacture textile fabrics. The incorporators are J. Miller, D. D. Miller and O. Fowler, Binghamton.

The Fred. S. Todd Shoe Company has been incorporated at Rochester, N. Y., with a capital stock of $85,000. The company will manufacture shoes, and is arranging for a factory. The incorporators are Fred. S. Todd, T. P. Conley and O Clark.

The New York Central & Hudson River Railroad Company has let the contract for pump house, dam and suction reservoir, including interior piping and gravity pipe line, which it is to construct at Clinton Point, N Y.

The Durr Packing Company, Utica, N. Y., has completed plans for a two-story addition it will make to its packing plant on Schuyler street.

The Utica Steam Engine & Boiler Works, Utica, N. Y., has plans in preparation for a steel and concrete foundry building 50 x 150 ft., one story, which it will add to its plant. The new foundry will be used largely for the molding of columns and other structural work.

The Buffalo Leather Oil Company has been incorporated at Buffalo, with an authorized capital stock of $100,000, and will establish a plant for the production of oils. The incorporators are W. Foster, F. Stein and J. T. Lyman.

The Lake Shore Construction & Supply Company, of Dunkirk, N Y., have received contract from the Board of Public Works, Geneva, N. Y., for construction of a sand filter plant, comprising the placing of pipes, gates and other operating apparatus, and construction of an operating house and a concrete reservoir at a cost of about $54,000.

The Vassar Brothers' Hospital, Poughkeepsie, N. Y., is receiving bids for the building and equipment of a one-story brick boiler house and laundry building 43 x 120 ft.

The Poughkeepsie Foundry & Machine Company, Poughkeepsie, N. Y., has let the contract for a one-story addition to be made to its plant.

The C. H. Lynch Shoe Mfg. Company, Poughkeepsie, N. Y., will build a four-story addition to its factory on Market street.

The R. U. Delephena Company, Poughkeepsie, N. Y., has awarded the contract for the erection of its factory building to cost $120,000 to the Amsterdam Building Company, New York City.

The Holmes & Morris Mfg. Company, recently incorporated at Syracuse, N. Y., has taken over the business of the Precision Mfg. Company, and will merge it with its own. The principal specialty will be die casting. No new machinery equipment will be required for the present.

The Lakeside Forge Company, Erie, Pa., has taken over and will enlarge the business of the Lakeside Forge & Wrench Company. Considerable new equipment will be added to the company's plant, including a number of drop hammers.

The Watson Paper Mills Company, Erie, Pa., will build a concrete addition, 80 x 120 ft., four-story and basement, to its plant at Sixteenth and Holland streets, to cost $60,000. The plans also include a two-story office building, 40 x 70 ft. The contract has been awarded to the Henry Shenk Company, and work will soon be started.

The Pennsylvania General Electric Company, Erie, Pa., has awarded the general contract for the erection of its new six-story pattern shop and pattern storage building, 75 x 400 ft., to the Henry Shenk Company, Erie. The reinforcing steel to be used in the concrete work will be furnished by the Pittsburgh Steel Products Company, Pittsburgh, and the ornamental concrete work by the Neville Concrete Company, Pittsburgh.

The American Emery Wheel Works, Providence, R. I., is erecting an addition to its plant, approximating 50 x 100 ft., to be three stories for part of its length and four stories the remainder. This will be used to enlarge its general manufacturing facilities and to add to the storage room of the plant, particularly for new material. Orders have been placed for the only new equipment needed, consisting of a freight elevator and a conveying system (chain).

Philadelphia

PHILADELPHIA, PA., August 30, 1911.

Inquiries show no material increase and sales are largely confined to single-tool propositions. Occasional moderate orders are reported, but as the business is usually divided among both merchants and manufacturers the proportion coming to each is usually small. In a few cases manufacturers of special equipment report increased plant operations, but the gains have not been large, although in some instances a steady, slight gain is to be noted. Export business in power transmission specialties is holding its own, and in instances an improvement is reported, but there has been little in the way of export business offered in the standard types of machine tools. The second-hand machinery market is quiet, reflecting the general condition of the machinery trade.

The Bower Construction Company, this city, is to

THE MACHINERY MARKETS

erect a steel and brick engine house for the Philadelphia & Reading Railway Company at its St. Clair plant.

The Committee of Supplies of the School Board, Reading, Pa., has announced the purchase of the major portion of the machinery equipment to be installed in the new manual training department of its school system, which will be ready for operation at the opening of the coming fall term.

The Pennsylvania Equipment Company, West End Trust Building, is in the market for a second-hand 300 kw., 250-volt, direct-current generator, with steam turbine, steam pressure 150 lbs., vacuum 26 to 28 in., and of a known steam consumption per kilowatt-hour.

Contractors are estimating on a two-story steel and corrugated-iron factory building, 39 x 45 ft., for the Tygert & Allen Fertilizer Company, to be erected at Greenwich Point, also on a one-story steel and corrugated-iron warehouse, 96 x 138 ft., to be built for the D. B. Martin Company, at Thirty-sixth street and Gray's Ferry avenue.

The Keyoke Railway Equipment Company has been incorporated at Dover, Del., with an authorized capital stock of $500,000, to engage in the manufacture and sale of such equipment. Particulars as to the personnel of those interested in the company are not available.

H. N. Herr, engineer, Hershey, Pa., has received proposals for the roadbed and construction work for 9½ mi. for the New Lebanon & Campbellstown street railway. All materials for the work, except masonry, are to be furnished by the company. Contracts are to be awarded at an early date.

The Quaker City Iron Works, Inc., is building an addition to its plant at Richmond and Tioga streets. A plot of ground 102 x 225 ft., adjoining its present plant, has been purchased and a building 102 x 175 ft. is in course of erection, to increase its facilities for general manufacturing purposes. The company builds steel tanks and makes a specialty of riveted heavy steel and iron-plate work. No additional machinery will be required.

The American Pulley Company reports business as steadily improving. The volume of orders taken this month exceeds that for July, and from present indications a further improvement is expected. A good share of the recent business comes from the Pacific Coast and the northwestern part of the United States. Export business is growing, heavy shipments having been made recently to various South American countries, Holland and Australia. Plant operations have been increasing during the past few months, the demand covering the company's general line of pulleys rather than any special styles or sizes.

Consolidations and absorptions of a number of the smaller gas and electric lighting concerns, which have recently been incorporated in large numbers to operate in this and adjoining districts, are announced. Papers certifying two big combinations, with capitals aggregating $6,500,000, practically controlled by Philadelphians, have been recorded with the State authorities at Harrisburg. These include the Philadelphia Suburban Gas & Electric Company, with a reported capital of $4,542,500, which took over the following companies in this vicinity: Gas company of Delaware County, gas company of Rockledge, gas company of Delaware County; Horham, Southampton, Upper Dublin, Whitpain, Warminster and Warwick townships electric companies; suburban electric company of Upper Pottsgrove, West Pottsgrove, Lower Pottsgrove, Upper Providence, East Pikeland, Limerick, East Vincent and East Coventry. The Luzerne County Gas & Electric Company, with a reported capital of $2,090,000, took over the following Luzerne County concerns: West Wyoming, Warrior Run, Union Township, Hunlock Township, Sugar Notch, Shickshinny, Larksville, Pringle Township, Wyoming Lake Township, Lehman Township, Forty Fort and Jackson Township, and a gas company of the West Side. While particulars are not available, it is said that the offices of the two companies will be located in this city.

Chicago

CHICAGO, ILL., August 29, 1911.

A steady demand for electric lighting and water power plant machinery is maintained in this market, but machine-tool requirements continue below normal. At the same time a survey of the manufacturing center in Northern Illinois brings to light that builders of drills, shapers, punches and shears, milling machines, engines and hoists at Rockford, Freeport, Moline and Quincy are adding to their plant equipment and capital resources to a significant degree. At Beloit and Milwaukee new construction is also noteworthy. It may be noted with interest that serious attention is being given to the development of the oil engine, incentive for which is to be found in the increase in the supply of fuel oil, due to the tremendous growth of gasoline production.

The Granger Electric & Mfg. Company, Warren, Ind., has been incorporated with a capital stock of $50,000, to make household electrical devices, such as toasters, irons and similar articles. The directors are Francis Granger, R. L. Tobin and Frank Canady.

Fire destroyed a portion of the plant of the McKee & Blisten button factory at Keithsburg, Ill., August 20, entailing a considerable loss.

The J. B. Stone Company, Grand Rapids, Mich., manufacturer of belt lacing and other specialties, will build a 50 x 100-ft. plant of brick and steel construction in that city. Plans are being prepared.

The Hugo Mfg. Company, maker of vacuum-cleaning machinery, has arranged to move to Warsaw, Ind., from Chicago, and will occupy buildings in that city formerly used as a chair factory.

The E-Z Opener Bag Company, with branches at St. Louis and Taylorville, Ill., will consolidate and move its headquarters to Decatur, Ill.

The Indiana & Michigan Electric Company is doubling the capacity of its plant at South Bend, Ind. It is stated that $250,000 will be spent for new buildings and equipment.

The Garden City Spring Company, Chicago, has arranged to increase its capital from $7,000 to $50,000.

Waukegan, Ill., is considering the matter of building a municipal lighting plant.

The Woodland Clay Company, Woodland, Ill., is increasing the capacity of its plant and is in the market for a steam shovel.

The Schreiber Potato Machinery Company, Hammond, Ind., was damaged by fire. Many of the shop tools were injured by the heat and water, and the pulleys and shafting will require replacement.

The Kissel Motor Car Company, Hartford, Wis., has completed plans and awarded contracts for a 107 x 200-ft. addition to its factory. Specifications covering the new machinery for this plant have not been issued.

Permits have been issued at Chicago for the building of the Continental-Commercial National Bank building, to cost $7,000,000, a building for Henry C. Lytton to cost $1,600,000 and a building for the Marshall Field estate to cost $1,600,000. All will require extensive power plants.

The Fox Typewriter Company, Grand Rapids, Mich., is building an addition to its plant two stories in hight and 48 x 60 ft. in plant.

The Service Electric Company, Chicago, has been incorporated with a capital stock of $5000 to manufacture electric machinery. The incorporators are Gerald G. Barry, Andrew W. Little and Lee Cohn.

The Harris Typewriter Company, Fond du Lac, Wis., of which Julius Kellar is president, has been incorporated with a capital stock of $350,000. A factory already built has been purchased, and in addition to machinery to be moved from the company's former location in the East, a number of new machine tools will be purchased.

The Iten Biscuit Company, with factories at Omaha, Neb., and Clinton, Ia., will build a five-story reinforced concrete plant at Oklahoma City, Okla.

The Clarage Foundry & Mfg. Company, gray iron castings, Kalamazoo, Mich., has completed a new machine plant, giving added capacity and may add considerable new machinery in the near future. The company has recently taken up the manufacture of exhaust fans and steel-plate blowers.

Cleveland

CLEVELAND, OHIO, August 29, 1911.

Contracts for $30,000 worth of machine tools for the machine-shop equipment for the new West Technical High School in this city will be placed in a few days, bids having closed. Specifications are also out for the woodworking machinery and forge-shop equipment for this school, bids for which will be received in about two weeks. With the exception of this prospective business the local machine-tool market is very dull. August is usually regarded as about the quietest month of the year, and reports from dealers indicate

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that the month just closing will be no exception. The volume of orders placed during the week was very light. One concern purchased several tools, aggregating about $5000, for enlargement of its repair department, but with this exception sales have been mostly in single tools, small lathes being more in demand than other tools. Few new inquiries are pending. Second-hand machinery is moving slowly and considerable is being offered. The demand for general machinery does not show much activity. Makers of heavy-handling machinery report a fairly good run of small orders but no contracts or inquiries for large installations. There is a good demand for ice-making machinery.

The Cleveland Board of Education will receive bids September 11 for the following machinery equipment for the woodworking shop and forge shop of the new West Technical High School:

Five wood turning speed lathes driven from one counter shaft, with 12-in. swing over bed and 24 in. between centers.
Thirteen motor head speed lathes with 12-in. swing and 24 in. between centers, and with direct current 220-volt motors.
One 30-in. band saw.
Two 30-in. band saws, motor driven by a 220-volt direct current 2-hp. motor.
One 36-in. band saw.
Four trimmers with 8-in. stroke and 4½ in. depth of cut.
Two revolving oilstone grinders, equipped with 1-hp motors.
One combination oilstone grinder.
One quick-sharpening oilstone grinder.
One 12-in. hand jointer.
One 18-in. patternmaker's lathe.
One universal saw bench.
One double-belted single-cylinder surfacer.
One swing cut-off saw.
One combination band saw filing, setting and jointing machine.
Fourteen double forges of single pedestal type, down draft.
One single forge.
Twenty-nine 120-lb. anvils.
Twenty-nine cast-iron anvil blocks.
One 20-in. upright drill.
One power shear.
One heating furnace.
One 60-lb. power hammer.
One blower and one exhaust fan, both with motor equipment.
In addition a large amount of small equipment will be purchased for the forge shop.

The Aluminum Foundry Company, Sebring, Ohio, in which Fred. Bauch, Alliance, and others are interested, has let the contract for the erection of a 50 x 150-ft. brick foundry building. In addition to aluminum castings the company will make aluminum cooking utensils.

The Phoenix Ice Making Machine Company, Cleveland, will probably build a new plant, as the site now occupied by the company is needed by the city in the erection of a new viaduct over Superior avenue.

The Cleveland Trolley Wheel Company, recently organized with a capital stock of $50,000 by S. L. McAdams and others, has established a plant in a power block on High avenue for the manufacture of a new trolley wheel for street cars.

A large glass manufacturing plant will be built in Urbana, Ohio, by the Eagle Glass Company, which has been incorporated with a capital stock of $75,000. John F. Holland, of Noblesville, Ind., and others are interested in the company.

The Carnegie Coal Company has let contracts for the construction of a large coal-handling and storage docks at Duluth. The contract for the coal-handling machinery has been placed with the Mead-Morrison Mfg. Company.

The Ohio Electric Company is planning the fitting up of car-repair shops in Zanesville, Ohio, having secured an option on the Blandy plant in that city for that purpose.

The Cleveland, Barberton, Coshocton & Zanesville Railway Company announces that it has found a market for its bonds, and will shortly begin the construction of the first section of its proposed trolley system. This will be between Cleveland and Orrville, a distance of 52 miles. J. J. Breitinger, of Cleveland, is the president.

A large addition will be built to the Ransbottom Brothers pottery plant, Roseville, Ohio. Eight new 30-ft. kilns will be provided. The new buildings will be equipped with three elevators.

The Canton Pump Company, Canton, Ohio, has reduced its capital stock from $50,000 to $5000.

The Summit Brick Company, in which a number of East Liverpool, Ohio, and Wheeling, W. Va., men are interested, has been organized to build a plant at Summitville Columbiana County, Ohio, for the manufacture of paving brick and building block.

The Maryland Standard Lime & Stone Company announces that it will shortly begin the erection of a $1,000,000 cement plant in connection with its crusher plants now in operation near Rolesburg, W. Va.

George E. Linn, Springfield, Ohio, is preparing to organize a company, which will probably be known as the Duplex Molding Machine Company, to build a plant and manufacture a molding machine which he has recently invented.

A site has been secured for a plant to be built by the Ohio Art Company, Bryan, Ohio. It is the intention to erect a three-story building and have it ready for operation by the first of the year.

Cincinnati

CINCINNATI, OHIO, August 29, 1911.

Boiler makers are very busy, but considerable of this activity is attributable to the large amount of repair work being done, as well as to the demand for tanks. The machine-tool situation shows no change, with the exception of a slightly better inquiry. Tools now being shipped out are going to all parts of the country, although Eastern business probably shows up better than that from other sections. The export demand from Europe is very encouraging.

Electrical equipment is not moving so freely as reports 30 days ago indicated, but sufficient orders are being booked to keep local manufacturers running full time, without having to pile up any large stocks.

According to a report issued August 23 by the Cincinnati Chamber of Commerce, the total output of all Cincinnati manufacturing industries during 1910 carried an estimated valuation of $325,000,000. This is $75,000,000 ahead of 1908, the year of the panic, which only showed up with an estimated output value of $250,000,000.

The Board of Education, Norwood, Ohio, will open bids September 18 for the heating and ventilating equipment for a large proposed high school building. The ventilating equipment includes air washers. Walter G. Franz, Union Trust Building, Cincinnati, is consulting engineer, and plans may be seen at his office.

The Coddington Mfg. Company, West Middletown, Ohio, has leased a building at 2268 Spring Grove avenue, Cincinnati, and will soon move its shoe polish and sealing wax manufacturing plant to the new location. George L. Link, Cincinnati, is the principal owner of this company.

The Norwalk Motor Car Company, Martinsburg, W. Va., is a new incorporation with $300,000 capital stock. Manufacturing plans have not been given out. F. A. Minor and S. P. Hopkins are named among the incorporators

It is reported unofficially that the Licking Light & Power Company's plant at Newark, Ohio, has been purchased by the American Gas & Electric Company, of the same city, and that it will be enlarged in the near future.

The Grafton Foundry Company, Grafton, W. Va., will rebuild its foundry recently destroyed by fire. The new structure will be of reinforced concrete construction.

The Rukin Paper Box Company, Cincinnati, will enlarge its factory on Third street, and will probably be in the market soon for some special equipment, including pulleys, shafting, etc.

The new addition to the sheet-metal plant of the Edwards Mfg. Company, Cincinnati, is now under cover and will soon be fitted up as a galvanizing department.

The Lodge & Shipley Machine Tool Company, Cincinnati, is now occupying the new large addition to its plant, recently mentioned as being under construction.

The outside work on the new engineering building for the University of Cincinnati has been completed, and the utmost energy is now being used to finish the interior in time for the opening fall session.

The Elbinger-Meiss Shoe Mfg. Company has been incorporated with $50,000 capital stock for the purpose of erecting a shoe factory at Lebanon, Ohio. E. H. and K. M. Elbinger and Nathan and Isaac Meiss, all of Cincinnati, are understood to be the principal incorporators.

The Toledo Annealing Charging Truck Company, Toledo, Ohio, has been incorporated with $10,000 capital stock. John G. Blum, Toledo, is interested in the new incorporation.

Some additional woodworking equipment may be needed by the L. A. Strobel Company, Cincinnati, as it intends to erect a large five-story factory at Winton place.

The Alloy Steel Casting Company is a new incor-

THE MACHINERY MARKETS

poration at Wheeling, W. Va., with $100,000 capital stock. W. M. Carr, Wheeling, is said to be the principal incorporator.

Detroit

DETROIT, MICH., August 29, 1911.

The local machinery market is quieter, and the outlook is not quite so cheerful, although a fair amount of business is being done. The automobile trade has about completed its purchases for the season and is reported to be well supplied with standard lines of machine tools. What business will come from this source from now on will be for special equipment, which will probably be ordered direct from manufacturers, and local dealers will not profit thereby. Outside of the automobile trade the city is also quiet industrially, and current orders from manufacturers are small. Power machinery and electrical equipment seem to be selling fairly well, and mill supplies are also in good demand. The foundry trade is reported to be rather unsatisfactory and the demand irregular, both for iron and steel castings. Second-hand machinery is moving very slowly.

The chief award in building circles this week was for a large factory building for the Metzger Motor Car Company. A fair amount of new building work is being figured on.

The Auto City Brewing Company, which recently completed its main plant, has commenced the construction of a large bottling works, for which a considerable mechanical outfit will be required.

The Board of Education will receive bids until September 5 for an electric generator for the Central High School.

The General Motors Company has acquired ownership of the Lansden Electric Wagon Company and will continue the manufacture of electric trucks in a plant to be located in Pontiac, Mich. John M. Lansden, of Newark, N. J., will, it is reported, have general charge of the plant, and machinery and equipment for the manufacture of the trucks will be installed as soon as possible.

The American Motor Castings Company, maker of gray-iron castings, has increased its capital stock from $200,000 to $250,000.

The Ross Motor Company has been incorporated with a capital stock of $350,000, with Frank P. Ross, George D. Bailey and Robert R. McKinley as the principal stockholders. No manufacturing plans have been given out.

The Cleinat Motor Parts Company, with a capital stock of $50,000, has been incorporated by Harry E. Walter, Graham Duffield and Henry B. Baxter.

The Soo Machine & Engine Works, Sault Ste. Marie, Mich., is planning an additional department for the manufacture of gasoline engines.

The Staunton Dialectic Rubber Company, Muskegon, Mich., is doubling the capacity of its plant.

The Union Steam Pump Works, Battle Creek, Mich., is doubling the capacity of its foundry and building a three-story pattern storage warehouse. The company also contemplates the erection of a power house.

The Copeman Electric Stove Company has been organized at Flint, Mich., with a capital stock of $500,000, and will manufacture a patent electric heater. Samuel H. Abbott is the principal stockholder.

The Holland Sugar Company and the St. Louis Sugar Company, operating plants for the manufacture of beet sugar at Holland, Mich., and St. Louis, Mich., respectively, have consolidated, and the new company will, in addition to operating its present factories, soon erect a third plant at some point in this State yet to be decided upon.

The Duroy Mfg. Company, Park Lake, Mich., maker of utensil handles, is adding an enameling department. The improvement will involve an expenditure of $12,000 and will include the purchase of some special enameling machinery.

The Flanders Mfg. Company, Pontiac, Mich., is doubling the number of hammers in its drop-forge plant, which are used to make castings for automobiles and motorcycles.

The Charlotte Commercial Club, of Charlotte, Mich., have about concluded negotiations whereby a company manufacturing steel doors and other metal products will locate in that city. J. C. Potter and C. S. Brown, of Charlotte, may be addressed.

The Calumet & Hecla Mining Company has begun construction on a large regrinding plant to handle mill tailings near Ishpeming, Mich. The company plans the erection of two similar plants in the near future.

Richard Roubus has established a plant for the manufacture of vulcanizers at St. Louis, Mich.

The Muskegon Steel Castings Company, Muskegon, Mich., has just completed its new building. It is 50 x 75 ft. and will be equipped with modern machinery.

A new company is being organized in Adrian, Mich., by A. G. and Leland Wesley for the manufacture of a patent machine for measuring cloth.

The Pyle Pattern Mfg. Company, Muskegon Heights, Mich., has filed articles of incorporation, giving its capital stock at $15,000.

The Stopple Kook Kit Company has been organized at Alma, Mich., with a capital stock of $10,000, for the manufacture of a patent cooking outfit. W. W. Stopple and O. W. Hayes are president and secretary, respectively, of the new company

The Breed Mfg. Company, Detroit, has secured options on a site for a plant in Bay City, Mich., and will in all probability remove its plant there in the near future. The company is a large manufacturer of motorcycles.

The Kalamazoo Spring & Axle Company, Kalamazoo, Mich., has bonded for $55,000, for purposes of business extension.

It is reported that the Wolverine Turpentine Company will soon establish a plant in Clare, Mich. B. F. Gitchel, Evart, Mich., is president of the company.

The Port Austin Canning Company, Port Austin, Mich., will soon place a branch factory at Croswell, Mich.

The O. & W. Thum Company, Grand Rapids, Mich., manufacturer of fly paper, has plans under way for an addition to its plant to be 110 x 160 ft., four stories and of brick and steel construction.

The City Council of Saginaw, Mich., has appropriated $85,000 for the erection of a bridge across the Saginaw River, to be of the Scherzer rolling lift type. Bids will soon be advertised for.

The J. B. Stone Company, Grand Rapids, Mich., manufacturing belt lacing and other specialties, has plans in the hands of architects for the construction of a new factory building, 50 x 100 ft., one story.

The Olds Motor Works, Lansing, Mich., has placed an order for approximately $15,000 worth of tools and equipment for installation in the addition now being constructed, and it is understood that another order will soon be placed.

Indianapolis

INDIANAPOLIS, IND., August 29, 1911.

The Indiana Steel & Iron Company, Linton, Ind., has been incorporated with $150,000 capital stock, to manufacture iron and steel. The directors are W. J. Hamilton, M. K. Frank and S. R. Sobel.

The Leedy Mfg. Company, Indianapolis, maker of musical specialities, has increased its capital stock from $25,000 to $100,000.

The Oaktown Gas Company, Oaktown, Ind., has been incorporated with $6,000 capital stock, to manufacture and distribute gas. The directors are William J. Walker, J. F. Stoelting and M. R. Polk.

The Evansville, Henderson & Owensboro Railway Company, organized and incorporated at Evansville, Ind., is authorized by its franchise to create and supply electric and other heat, light and power, as well as to construct and operate an electric interurban railroad.

The Brown Straw Binder Company, Indianapolis, has increased its capital stock to $250,000.

The plant of the Vulcan Steam Shovel Company, in course of erection for several months at Evansville, Ind., will be ready for operation December 1. It is expected to employ 700 men at the start.

The insurance in the loss of the shovel department of the Indiana Rolling Mill Company at Newcastle, Ind., burned three months ago, has been adjusted and the factory buildings will be reerected and constructed of concrete. The loss was $200,000.

The Casmire Freezer Company, Indianapolis, has been incorporated, with $10,000 capital stock, to manufacture freezing machines. The directors are B. A. Casmire, C. E. Barrett and C. B. McCulloch.

The National Aluminum & Bronze Company, Indianapolis, has been dissolved.

The Clinton Electric Light & Power Company, Clinton, Ind., has increased its capital stock from $10,000 to $40,000.

The Carbo-Light Company, Anderson, Ind., has increased its capital stock to $40,000.

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The Standard Cabinet Company, Peru, Ind., is erecting two two-story brick buildings, 40 x 90 ft., as an extension of its plant.

The Roberts Foundry Company, Indianapolis, has been incorporated with $10,000 capital stock, to do a general foundry business. The directors are W. H. Roberts, Emerson Davis and Elmer E. Wetzel.

The White River dam at Noblesville, Ind., has been sold by the trustees to D. P. Williams, attorney, Indianapolis, for unnamed buyers. The price paid was $30,000. The dam and power house have not yet been completed, but the purchase is supposed to imply the continuation of work.

The Adjustable Shade Holder Company, Bedford, Ind., has been organized with $10,000 capital stock, to manufacture shade holders and other articles. The directors are R. K. Wicker, James O'Connell, E. E. Mitchell, J. J. Quinn and J. R. Voris.

The Ideal Concrete Machinery Company, South Bend, Ind., has increased its capital stock to $500,000, and has leased another building in order to increase its output.

The Standard Mfg. Company, Peru, Ind., has let contracts for new buildings that will add 144,000 sq. ft, to the floor space.

The Middle West Coal Briquette Company, Gary, Ind., has been incorporated with $350,000 capital stock, to utilize "breeze" or coke oven dust, in connection with coal dust and pitch. The capacity of the plant will be 600 tons of briquettes a day. The directors are J. A. Brennan, J. McFadden and E. D. Missner.

The Wire Specialty & Machine Works, South Bend, Ind., has been incorporated with $40,000 capital stock. The directors are Thorwald Hansen, Gerald Mahony and Marion Campbell.

T. B. Dean, Chicago, has been granted a 25 year franchise at Gary, Ind., for a central heating plant.

The Rushville Furniture Company, Rushville, Ind., which is equipping a factory for the manufacture of furniture, is asking for bids on an engine and boilers to be opened September 5. Address A. L. Stewart, secretary.

The South

LOUISVILLE, KY., August 29, 1911.

Business in this market is improving somewhat, according to reports from machinery builders and dealers. The breaking of a severe drouth in Kentucky has helped the purely local demand. Manufacturers of refrigerating machinery report a good volume of inquiries, but add that comparatively few orders are being secured. Quarry-equipment manufacturers state that there is a lull in the stone trade which has affected their business. The enormous number of electric-light, water-works and other public-service projects on in the South has caused big business for the manufacturers of electrical equipment and power machinery. A few machine tools are being sold through the South in the equipment of manual training departments in local schools, this idea having been taken hold of with more vim in recent years. The export trade, which is handled by several Louisville manufacturers, is reported to be rather quiet at this time.

The Kentucky Wagon Mfg. Company, Louisville, has announced plans for the manufacture of motor-truck bodies, delivery wagons, carts and drays, in addition to farm wagons, which it has been making for 30 years. Additional equipment will be installed in the woodworking and blacksmith departments. W. C. Nones is president of the company, which has one of the largest plants of its kind in the country.

The Norman Woodworking Company, Louisville, has filed articles of incorporation, with $25,000 capital stock. It is erecting a planing mill, which will be operated electrically. The project has been previously referred to in connection with the Norman Lumber Company. A. E. Norman is the principal stockholder and president.

The Fairbanks-Morse Company has been given the contract for the installation of dynamos and other electrical equipment in the engineering building of the University of Louisville. W. M. Anderson is in charge of that department.

Daniel H. Burnham, Chicago, has been named by John P. Starks, Louisville, as the architect of the new building which Mr. Starks will erect at Fourth avenue and Walnut street.

Brinton B. Davis, Louisville, architect for the Inter-Southern Life Insurance Company's 18-story building, has issued specifications for the steel work. It will require 1100 tons.

The Kentucky State Fair will be held in Louisville September 11-16. Commercial organizations have arranged a display of Louisville manufactures for the occasion. A special section has been set apart for the exhibit.

The Harrison Improvement Company has been organized at Harrison, Ind., near Louisville, and will drill for oil wells. The company has leased a large amount of land. J. M. Doak, Terre Haute, is president of the company.

The Henry Vogt Machine Company, Louisville, reports trade good, though inquiries outnumber orders. A lot of promising business is in the market, in both refrigerating machinery and boiler lines, and an active fall is expected.

The James Clark, Jr., Electrical Company, Louisville, is pleased with the situation, and notes an improvement in trade, although the export demand is rather quiet at present.

E. F. Wheaton is organizing a company at Hickman, Ky., under the name of the Kentucky Southwestern Railway, Light & Power Company, which, it is stated, has been chartered in Delaware. The purpose of the company is to build a traction line from Paducah, Ky., to Hickman.

John W. Strahl, formerly connected with the mechanical department of the National Cash Register Company of Dayton, Ohio, has been appointed a superintendent at the plant of the Anglo-American Mill Company, Owensboro, Ky. The company is now completing the equipment of a plant for the manufacture of small flour mills, and expects to begin operations within 30 days.

J. F. Bullitt, Harlan, Ky., is president of a company which has been organized at Big Stone Gap, Va., for the purpose of operating a crushed-stone plant.

The St. Bernard Mining Company, Earlington, Ky., is completing plans for the erection of a tipple. John B. Atkinson is president of the company.

The Kentucky-Panama Coal Company, recently organized with $1,000,000 capital stock for the purpose of developing several thousand acres of coal lands in western Kentucky, is said to be ready for actual operations. Bids will be asked on power machinery, mining tools, etc., within 60 days, it is reported. Inkerman Bailey, Sr., 66 Broadway, New York, is head of the company.

The City Council of Owensboro, Ky., has appropriated $30,000 for the improvement of the electric-light plant owned and operated by the municipality.

The Selby Shoe Company, Ashland, Ky., is adding machinery for the enlargement of its factory.

Plans for the erection of a huge tobacco factory at Lexington, Ky., are still being discussed, although, in view of the fact that a receiver has been asked for the Burley Tobacco Society, it is not likely that the latter organization will carry out the plans which it had for the plant.

C. C. Hinton, Evansville, Ind., who is erecting a sawmill for handling cedar logs at Bowling Green, Ky., has decided to operate the plant electrically, and is buying motors and other equipment. J. Rowland Madison is in charge of the construction of the mill.

The Cayce-Jones Motor Company, Hopkinsville, Ky., has been organized with $10,000 capital stock by L. M. Cayce and Thomas C. Jones, of Rich, Ky. The company will equip a large repair shop, and will be in the market for lathes, shapers and other machine tools.

A $15,000 company is being organized at Midway, Ky., for the erection of an ice factory.

The Wasioto & Black Mountain Railroad has completed the construction of an extension to the coking ovens now being erected by Wisconsin Steel Company near Harlan, Ky.

A mill has been established at Nicholasville, Ky., for handling barytes. The ore is being secured from Jessamine, Mercer and adjoining counties in central Kentucky.

It is reported that a company is to be organized at Harrodsburg, Ky., for the establishment of a cement mill.

The American Traction Company, Indianapolis, is planning the construction of interurban lines in western Kentucky. A line from Henderson to Uniontown to Paducah is one of the first which will be built.

The Cahaba Coal Mining Company, Corydon, Ky.,

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is planning increased operations, and is completing negotiations for the purchase of additional coal lands.

The W. W. Wynns Ice & Water Company is being organized at Sturgis, Ky., for the purpose of erecting an ice factory and water-works system. The initial capitalization is to be $15,000. W. W. Wynns is organizing the company.

The Isbell-Chapman Electric Company, Bowling Green, Ky., will install dynamos and some of the other equipment to be used in the new lighting plant of Gallatin, Tenn.

The department store of Miller Bros., Chattanooga, Tenn., is to install electrical equipment for the purpose of enabling current from a local central station to be used in lighting the building and operating the elevators.

Knoxville, Tenn., has given a franchise to the Eastern Tennessee Power Company, which is completing a plant on the Ocoee River, whereby the company may sell light and power in Knoxville during a period of 35 years. The company agrees to give consumers a decided reduction in the present rates for light and power.

The Maryville, Tenn., Electric Light, Heat & Power Company has been organized with $100,000 capital stock for the purpose of erecting a large hydroelectric plant on Abram's Creek, a distance of 25 miles from Maryville. The incorporators of the company are I. B. Zeigler, John M. Clark and James A. Goddard.

The Narragansett Machine Company, Providence, R. I., has been awarded a contract for the equipment of the gymnasium of the new building of the Y. M. C. A. at Nashville, Tenn.

A school of technology is to be established at Chattanooga, Tenn. Prof. George Bierly, of the University of Chattanooga, is organizing the institution.

An unconfirmed report from Knoxville, Tenn., states that the Chilhowee Mineral & Mfg. Company has purchased ore lands in Blount County and will erect a blast furnace near Knoxville.

The Maryville Hosiery Mills, Maryville, Tenn., the plant of which was destroyed by fire recently, is to be rebuilt in the immediate future. The building will be 35 x 135 ft. and will be fireproof. The cost of the new plant will be $40,000. R. B. Oliver is president of the company.

The Keiser-Geismer Engineering Company, Chattanooga, Tenn., has been incorporated with $10,000 capital stock by H. S. Geismer, S. R. Roddy and Alex W. Chambliss.

The Hamilton County Commission, Chattanooga, Tenn., is considering plans for the enlargement of the county jail.

A $40,000 bond issue is to be made by Bristol, Tenn., for the purpose of constructing a pipe line from Franklin to Bristol. The bond issue was authorized by the State Legislature.

The Arkadelphia Milling Company, Arkadelphia, Ark., will erect an ice factory, and will contract for the equipment within the next 60 days.

The Western Wheelbarrow & Mfg. Company, Ft. Smith, Ark., has taken over the plant of the Ft. Smith Stove Company. Both lines will continue to be manufactured.

The Tri-City Gas Company, Gadsden, Ala., will extend its mains to Alabama City and Attalla.

Meriden, Miss., is contemplating the equipment of a manual training department in its local schools. P. J. Krouse is interested in the plan.

The Tri-Cities Garage, Sheffield, Ala., is in the market for a 24-in. milling machine. E. Dowd is in charge of the garage.

Stevenson, Ala., is to have a water and electric-light plant. Plans are being drawn by the J. B. McCrary Company, Atlanta, Ga.

Palmetto, Fla., has voted a $20,000 bond issue for a water-works system.

Clarksville, Ark., will vote on a bond issue of $75,000 for the purpose of erecting an electric-light plant and a system of water works.

R. R. Chamberlain and others will construct a water plant at Malvern, Ark., a franchise for that purpose having been recently awarded.

Williamsburg, Ky., has under consideration a bond issue of $30,000, the proceeds of which will be used in the construction of water works. The vote will be taken in November.

The American Metallic Packing Company, Lexington, Ky., is in the market for an air compressor with a capacity of 100 cu. ft. Second-hand equipment is preferred.

William H. Gurd, Middlesboro, Ky., is considering plans for the establishment of a glove factory.

The Gainesville Iron Works, Gainesville, Ga., is in the market for a compound duplex steam pump, with 10-in. suction and 8-in. discharge.

The Southwestern Traction & Power Company, New Orleans, La., will let a contract shortly for the erection of a power house at New Iberia, La. The equipment will include two 250-hp. water-tube boilers, turbines, generators, etc.

Texas

AUSTIN, TEXAS, August 26, 1911.

Rapid deterioration of the cotton crop during the past week, due to the drouth and hot winds, had a depressing effect upon business. There is much activity in the sale of irrigation machinery in the more arid portions of the State in preparation for next season's crops. Machinery dealers look for little, if any improvement in the trade situation in Mexico until after the presidential election in October. Many mines are holding up orders for machinery until it is seen how the country comes through the election period.

It is announced that the new general office building of the Missouri, Kansas & Texas Railroad at Dallas will be equipped with a cold-water circulating system, a vacuum cleaning system, an electric light and power plant and other modern appliances.

The Houston Gas Company will install a new gas holder to cost $100,000. It is now installing a new gas machine with a daily capacity of 2,500,000 cu. ft. of gas. It has extended its gas-distributing system 12 miles during the last few weeks.

The Merchants' Gin Company has been formed at Gilmore, with a capital stock of $5000. The incorporators are W. R. Crim, W. M. Crim and Roy L. Laird.

The election of taxpayers on August 21 to vote on the proposition to issue $20,000 in bonds for the completion of the municipal water, light and sewer systems at Bryan resulted favorably.

Max Winfield, St. Louis, Mo., is considering the establishment of a $50,000 canning factory at San Antonio.

The O'Neil Engineering Company, Dallas, has been awarded the contract by the City Council of Hearne, for installing a water-works plant and distributing system.

The Flatonia Ice, Water & Electric Light Company, Flatonia, will install a cold-storage plant and make other improvements.

The Del Rio Water Company will install a 200,000-gal. steel storage tank and make other additions to its water-works plant and distributing system at Del Rio.

The Bonham Gas & Electric Company will erect a new power house and install new machinery at Bonham.

Morris & Co., Chicago, are considering the erection of a large meat-packing plant at El Paso.

Taxpayers of Alice have voted to issue $20,000 of bonds for installing a water-works plant.

An effort is being made by the people of Longview to secure the removal to that place of the general shops of the International & Great Northern, which are now at Palestine, and of the Texas & Pacific, now at Marshall. A bonus of $100,000 is offered to bring about the desired improvements.

The Indiana Co-operative Canal Company, Brownsville, has let the contract to J. C. Debruin, Brownsville, for the rebuilding of its canal system. The pumping plant will be equipped with new machinery.

The Texarkana Gas & Electric Company, Texarkana, recently petitioned to increase its capital stock from $200,000 to $600,000.

The Planters' Oil Company, Hearne, has increased its capital from $50,000 to $75,000.

The Tel-Electric Company, Houston, has increased the capital stock from $50,000 to $100,000.

The Zimmerman Land & Irrigation Company has been formed with a capital stock of $200,000, to construct an irrigation system in Pecos County. The incorporators are Davis Zimmerman, James W. Fogelman and Silas E. Rice.

The Arkansas Fertilizing Company, Little Rock, will erect a fertilizer plant at Houston. F. S. Williams is general manager.

C. E. Foster and J. D. Burkhart, Helene, N. M., will erect a factory for the manufacture of porcelain ware.

THE MACHINERY MARKETS

They own a deposit of kaolin 25 mi. east of Tucumcari, N. M.

The improvements under way at Galveston, Tex., for the Gulf, Colorado & Santa Fe Railroad, include a 16-stall roundhouse to be equipped with an 85-ft. turntable to cost $46,000, a brick machine and blacksmith shop to cost $9,500 and a power house and steel water tanks.

St. Louis

ST. LOUIS, MO., August 28, 1911.

The condition of the machine-tool market continues quiet so far as orders of large size are concerned, but there is a fair run of requests for individual machines for special uses and for the extension or replacement of present equipment. This demand is general, being confined to no one section of the St. Louis trade territory nor to any one branch of business. There is an increasing number of inquiries and from these the dealers augur a good fall business as soon as that season fairly sets in.

The Electric Motor Car Company has been incorporated in St. Louis to manufacture electric motor-car parts and supplies and will establish a plant therefor. The preliminary capital stock is $10,000. The incorporators are Noble H. Davis, A. J. Davis and Arthur E. Keller.

The city of Kirkwood, which voted on a bond issue for the acquisition and extension of the municipal electric-light plant, passed the proposition and will at once proceed with the work.

The Jack Possum Mining Company, Joplin, Mo., has been incorporated with $60,000 capital stock by J. N. Doty, James Roller and W. J. Owens. They will install mining equipment on the property controlled by the company.

The Bangor Zinc Mining & Smelting Company has been incorporated with $30,000 capital stock in St. Louis by C. W. Dice, Gustave A. Robyn, John Ferris, William H. Beach and Frank T. McDonagh. The company will put in mining equipment on its Joplin district property.

The Lasswell Land & Lumber Company, Hollywood, Dunklin County, Mo., has increased its capital stock from $20,000 to $50,000 for the purpose of installing new sawmill equipment.

The Elgin Silver Plate Company, with $100,000 capital stock has been incorporated at Elgin, Ill. The incorporators are J. M. Blackburn, G. W. Blackburn and R. W. Crocker.

The Hamilton Clay Mfg. Company, Carthage, Ill., has been reincorporated with $100,000 capital stock, and is to install additional equipment for clay manufacture.

The Donk Bros. Coal & Coke Company, St. Louis, is preparing to open three new mines on its Illinois coal land south of Edwardsville and north of the territory now being worked.

Maryville, Mo., voted a bond issue of $100,000 to extend the present water system.

The Kirkwood Sash & Door Company, Kirkwood, Mo., has been incorporated with $12,000 capital stock by Charles R. Reid, Oscar Stager and C. H. Mueller, and will install a small but complete plant for woodworking.

The Commercial Envelope & Paper Box Company, Binghamton, N. Y., has optioned a site here for the construction of a branch factory.

Ness City, Kan., has voted a bond issue of $16,000 for the rebuilding of the electric-lighting plant recently destroyed by fire.

Eastern Canada

TORONTO, ONT., August 26, 1911.

Good reports continue to be the rule in all industries using and producing machinery or equipment of any description. Competition from the United States is undoubtedly keener than it was. This is supposed to be due in part to some degree of dullness in business activity there, and in part to the chance of our elections turning out favorably for the government on September 21 and bringing about the establishment of the reciprocity agreement. There is no perceptible slackening of operations on this side in anticipation of such an outcome. It is felt, however, that, should the agreement be approved at the polls, the time would not be distant when another installment of reciprocity would be agreed upon, and that it would include manufactures from the United States. The view of domestic manufacturers appears to be a combination of the reflection that sufficient unto the day is the evil thereof and of the expectation that the government will be defeated. As to this latter point neither side can claim to have a greater degree of prophetic inspiration than the other. The fact, at all events, is that the trade and industry of Canada are surprisingly active for the time of year, and the manufacturers who turn out machinery and plant, have the prospect of continued activity for months to come. A few weeks hence when threshing is over and the marketing of grain has begun the farmer will have the initial purchasing power to set a large business in motion along all the channels of industrial and commercial enterprise. While the banks are husbanding their resources so as to be able to give all the assistance required to move crops, so far manufacturers have not been subjected to any sharp contraction in accommodation.

The Aspinwall Mfg. Company, Jackson, Mich., has a Canadian branch of its works in Guelph, Ont. It is considering the purchase of a site upon which to build much larger works than it is now operating there.

The Gilson Mfg. Company, whose headquarters are at Port Washington, Wis., is about to erect an additional building at its works in Guelph, Ont., where it finds it necessary to increase its core-making capacity for the manufacture of gasoline engines.

The Pollock Mfg. Company, Berlin, Ont., which makes hornless phonographs, is increasing its capital to $100,000, and will add largely to the capacity of its works.

The Polson Iron Works, Toronto, has been advised from Ottawa that an order-in-council has been passed by the Dominion Government granting an annual bonus of three per cent on $900,000 for 20 years to assist the company in building a drydock. The work of construction is to be begun at once.

J. B. Tudhope, president of the Carriage Factories, Ltd., and of the Tudhope Motor & Carriage Company, Orillia, Ont., announces that he and some associates have just formed a company to manufacture farming implements in Orilla. He said that the foundation of a factory building to cost upward of $400,000 is about to be begun.

John Reid, representing Cammell, Laird & Company, the British ship builders, whose tender for constructing the Canadian naval vessels is said to be the lowest, has been in St. Johns, N. B., discussing the question of locating the plant there.

The Montreal Herald says that a United States company is preparing to apply $30,000,000 of capital in the construction of mills, water powers, etc., in Quebec province for the manufacture of news print, card board, chemical pulp, etc.

The N. B. Pulp & Paper Company, Milletron, N. B., has the foundations ready for the machinery of its new mill.

The Galt Car & Coach Company, Galt, Ont., is erecting an additional factory, 60 x 200 ft. and is planning for the addition of a saw mill outfit.

The Clare Bros. Company, Galt, Ont., is calling for tenders for a large addition to its moulding shop.

Canadian Jewellers, Ltd., have just received a charter of incorporation from the Dominion Government. Its capital stock is $5,000,000, and its principal place of business is to be in Montreal.

Ruth & Condon, proprietors of the Novel Foundry, Peterboro, Ont., are installing a molding department.

The Board of Control of Toronto has decided to spend $420,000 more on its water filtration plant.

The great power station which the Canadian Light & Power Company is erecting at St. Timothe is now ready for operating the first installation of 7500 hp. Another unit of the same magnitude is to be installed in the near future.

The exhibition of power plant specialties held in Stratford about a month ago is reported to be bearing fruit in the way of business. Besides Canadian manufacturers, several United States companies had articles at the exhibition.

The Cockshutt Plow Company, Brantford, Ont., and the Frost & Wood Company, Smith's Falls, Ont., have joined their sales departments, the former company taking all the Canadian territory west of Peterboro, and the latter taking the remainder of Canada.

The Frost & Wood Company is about to increase its plant at Smith's Falls, Ont., by its addition of warehouses, the enlargement of its foundry and construction of new cleaning and tumbling mill rooms.

The Jenckes Machine Company, Sherbrooke, Que., has recently placed a large rubber conveyor belt con-

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tract with the Goodyear Tire & Rubber Company of Canada.

The Doty Engine Works Company, Goodrich, Ont., is about to build a new factory.

The Steel Company of Canada, Hamilton, Ont., is having plans prepared for putting in a 2000 hp. motor to operate its main steel works.

Cluett, Peabody & Co., Troy, N. Y., and St. John, Que., is about to install a steam power electric plant and machinery in its factory in the latter place.

D. J. Albertson, Kalamazoo, Mich., is preparing plans for a tissue paper factory in St. Catherines, Ont.

Up to September 17, tenders for the purchase of all the assets of the Standard Fitting & Valve Company, Guelph, Ont., will be received by John M. Taylor, liquidator, Guelph, Ont., pursuant to an order for the judicial sale of the property.

The municipalities of St. John and Iberville, Que., are about to build a bridge across the Richelieu River at St. Johns, Que., to cost $154,000. The contractors are Lemoine & Co., 262 Park Lafontaine, Montreal.

The County Council of Wellington, Ont. has decided to buy a set of road machinery. Information can be had from James Beattie, Fergus, Ont.

Plans have been prepared for a sewer system and sewage disposal plant at St. Mary's, Ont., to cost $201,500.

A by-law will be submitted shortly to the electors of Galt, Ont., for the raising of $10,000 to improve the municipal water works.

A branch plant is being established at Hamilton by the Schacht Motor Car Company, Cincinnati, Ohio. The factory building at Sanford and Cumberland avenues, Hamilton, formerly occupied by the Tilden-Jackson Company, has been purchased and is being equipped with a full line of up-to-date machinery. A large addition to the factory is being planned, to be erected next spring, doubling its capacity. Thomas T. Rolph, Toronto, is president of the Canadian branch company; T. H. Schacht, Cincinnati, vice-president.

The Preston Woodworking Machinery Company, Ltd., Preston, Ont., of which W. S. Hudson is president, is making preparations to add largely to its machinery equipment.

Western Canada

WINNIPEG, MAN., August 26, 1911.

Reports of western Canada business conditions point to the existence of a demand for local factories and for more distributing warehouses. Parties who have connections with the East and are thus interested in pushing lines made in Canada, find themselves often more or less handicapped by the difficulty of making prompt delivery to customers. This is largely a consequence of the great activity in the factories of eastern Canada, and it begins to be felt that, very much as American manufacturers have in many cases found it necessary to establish branches in Canada, so eastern Canadian manufacturers may find it to their advantage to establish branches in western Canada.

The city of Calgary, Alberta, has a programme of waterworks extensions, calling for about 30 miles of new mains, which is expected to be fully carried out before the end of next year.

The Moran Company, Seattle, Wash., has received the contract for a 6,000,000-gal. steam-driven centrifugal pump for Edmonton water works, the cost to be $18,000.

A by-law has been submitted to the rate payers of Saskatoon, Sask., for a raising of $73,000 to be expended on water works extension.

Mueller & Taylor, 407 Hastings street, west, Vancouver, B. C., have received the contract for 13 bridges of concrete, and are in the market for reinforcing steel, timber, etc.

The Coulther-Waugh Fur Company, Montreal, have called for tenders for the erection in Calgary, Alberta, of a warehouse to cost about $40,000.

The Alberta Pacific Elevator Company has begun the erection of a large elevator at Brooks, Alberta.

A. M. Rockwell & Co. are about to erect a large storage warehouse in Chilliwack, B. C.

Russell Bros., machinists, Fort Frances, Ont., are about to build, a new foundry, in the outfit of which will be some new devices of the company's own invention.

The Western Canada Flour Mills Company, whose head office is at St. Boniface, Man., is almost doubling the capacity of its plant at Rainy River, Ont.

The Rat Portage Lumber Company, whose head office is in Winnipeg, is considering the matter of rebuilding the saw mill recently destroyed at Rainy River, Ont.

Foundations are being laid for a building in Winnipeg for the recenty incorporated Hardstone Brick Mfg. Company. Its capital stock is $500,000.

Machinery has been ordered for the Sapperton Cement Tile Works Company, whose plant is being built at Sapperton, B. C.

Car works for the Grand Trunk Pacific Railway Company are to be constructed at Edson, Alberta. They are to be of standard capacity for a principal division point.

A shipment of 10 tons of saws, circular and band, forwarded from Hamilton, Ont., along with a quantity of electric machinery, has just been received by the Ocean Falls Pulp Company, at Ocean Falls, B. C.

The Alberta Pressed Brick Company, with headquarters in Calgary, is considering the erection of a large plant in Edmonton, Alberta.

Lacy Bros., Ltd., London, England, have begun the construction of branch works at Transcora, near Winnipeg. Several factories for the manufacture of ammunition and small arms will be put up on the large site the company has obtained. The factory, now under way, will, it is estimated, cost about $50,000.

C. C. Godding, representing the Tarcoma Match Company, is negotiating for the starting of a company to manufacture matches at New Westminster, B. C.

Government Purchases

WASHINGTON, D. C., August 28, 1911.

The Paymaster General, Navy Department, Washington, will open bids September 5, schedule 3833, for twenty sets steam turbine driven blowers for delivery to Brooklyn and on September 19, under schedule 3837, one motor driven winch for delivery to Mare Island.

The Quartermaster, United States Army, Portland, Me., opened bids August 15 for pumps and pumping machinery for the new storage plant at Fort Levett, Me., as follows: Bidder 1, Simpson Brothers' Corporation, Boston, Mass., $5000; 2, M. L. Baird & Co., Philadelphia, Pa., $5,000; 6, John W. Danforth Company, Washington, D. C., $5214; 8, F. & C. B. Nash Company, Portland, Me., $5333, alternate, $3815; 9, Mahoney Construction Company, Portland, Me., $4585.

The Constructing Quartermaster, Madison Barracks, N. Y., opened bids August 16 for new pumping plant as follows: Campbell & Lewis, Watertown, N. Y., $2200; Engineering Construction Company, New York, $2250; Edward Joy Company, Syracuse, N. Y., $2269; Fairbanks, Morse & Co., Chicago, Ill., $2138.

The Bureau of Supplies and Accounts, Navy Department, Washington, opened bids August 12 for a 12-in. electrically driven suction dredge as follows: Norbom Engineering Company, Philadelphia, Pa., $37,750; Alexander Miller & Brother, Jersey City, N. J., $34,900; Ellicott Machine Company, Baltimore, Md., $34,600.

The Commissioners of the District of Columbia opened bids August 15, for furnishing under item 1, one 18-hp. double cylinder locomotive traction engine and item 2, one 18-hp. return flue traction engine as follows: Geiser Mfg. Company, Waynesboro, Pa., item 2, $1834; W. B. Moore, Washington, D. C., item 1, $1,775, item 2, $1425; Frick Company, Waynesboro, Pa., item 1, $1,250 and item 2, $1,325.

The Bureau of Supplies and Accounts, Navy Department, Washington, opened bids August 15 for 14 electrically driven forced draft blowers, schedule 3800, class 11, as follows: Bidder 2, General Electric Company, Schenectady, N. Y., $34,000; bidder 3, Newport News Shipbuilding & Dry Dock Company, Newport News, Va., $31,738.

The Bureau of Supplies and Accounts, Navy Department, Washington, opened bids August 22 for material and supplies for the navy yards as follows:

Schedule 3805, class 91, one automatic railway cut-off saw—Bidder 88, J. A. Fay & Egan Company, Cincinnati, Ohio, $540 and $648; 98, Greenlee Bros. Company, Rockford, Ill., $498, $579 and $554; 127, E. F. Kirwan Company, Baltimore, Md., informal; 142, Manning, Maxwell & Moore, New York, $682.50; 210, Bentel & Margedant Company, Hamilton, Ohio, $525.

Schedule 3806, class 101, one combination cold saw cutting off machine—Bidder 127, E. F. Kirwan Company, Baltimore, Md., $1,950; 163, Newton Machine Tool Works, Cincinnati, Ohio, $1,000; 167, Niles-Bement-Pond Company, New York, $1,055 and $2,056.

Shedule 3807, class 111, one twelve hp. gasoline engine—Bidder 127, E. F. Kirwan Company, Baltimore, Md., $1,160; 238, De La Vergne Machinery Company, New York, $1,682; 261, Charles J. Jaeger, Boston, Mass., $2,100.

Current Metal Prices.

The following quotations are for small lots, New York. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market review.

IRON AND STEEL—

Bar Iron from Store—

Refined iron:
1 to 1⅞ in. round and square.... ℔ lb 1.70¢
1½ to 4 in. x ⅜ to 1 in..... ℔ lb 1.70¢
1½ to 4 in. x ½ to 5-1 ..... ℔ lb 1.80¢
Rods—⅜ and 11-16 round and square. ℔ lb 1.80¢
Angles: Cts. ℔ lb.
3 in. x ¼ in. and larger.....1.90¢
3 in. x 3-16 in. and ⅛ in.....2.30¢
1½ to 2½ in. x ⅛ in.....2.05¢
1½ to 2¾ in. x 3-16 in. and thicker....1.95¢
1 to 1¼ in. x 3-16 in.....2.05¢
1 to 1¼ x ⅛ in.....2.10¢
⅞ x ⅛ in. .....2.20¢
⅝ x ⅛ in. .....2.25¢
⅝ in. x ⅛ in.....3.45¢
½ x 3-32 in. .....3.90¢
Tees:
1 in. .....2.35¢
1¼ in. .....2.20¢
1½ to 2½ x ¼ in.....2.00¢
1½ to 2½ x 3-16 in.....2.10¢
3 in. and larger.....2.95¢
Beams .....1.90¢
Channels, 3 in. and larger.....1.90¢
Bands—1½ to 6 x 6-16 to No. 8.....2.10¢
Burden's "H. B. & S." iron, base price....2.95¢
"Burden's Best" iron, base price.....3.15¢
Norway bars .....3.60¢

Merchant Steel from Store—

per lb
Bessemer machinery.....1.90¢
Toe calk, tire and sleigh shoe.....2.50@3.00¢
Best cast steel, base price in small lots.....7¢

Sheets from Store—

Black

	One pass, C.R. soft steel.	R. G. cleaned.
No. 16.....	℔ lb 2.45¢	2.75¢
Nos. 18 to 20.....	℔ lb 2.50¢	2.85¢
Nos. 22 and 24.....	℔ lb 2.55¢	2.95¢
No. 26.....	℔ lb 2.60¢	3.05¢
No. 28.....	℔ lb 2.95¢	3.30¢

Russia, Planished &c.

Genuine Russia, according to assortment .....℔ lb 12 @14¼
Patent planished, W. Dewees Wood.....℔ lb A, 10¢; B, 9¢ net

Galvanized

Nos. 12 and 14.....℔ lb 2.75¢
No. 24 .....℔ lb 3.10¢
No. 26.....℔ lb 3.30¢
No. 28.....℔ lb 3.60¢
No 20 and lighter 36 inches wide, 25¢ higher.

Genuine Iron Sheets—

Galvanized

Nos. 22 and 24.....℔ lb 5.50¢
No. 26.....℔ lb 6.00¢
No. 28.....℔ lb 7.00¢

Corrugated Roofing—

2½ in. corrugated.	Painted.	Galvd.
No. 24.....	℔ 100 sq. ft...$3.75	$4.70
No. 26.....	℔ 100 sq. ft... 2.85	3.90
No. 28.....	℔ 100 sq. ft... 2.50	3.65

Tin Plates—

American Charcoal Plates (per box)

"A.A.A." charcoal:
IC, 14 x 20.....$6.65
IX, 14 x 20..... 7.90
A. charcoal:
IC, 14 x 20.....$5.60
IX, 14 x 20..... 5.70

American Coke Plates—Bessemer—
IC, 14 x 20.....107 lb.....$4.50
IX, 14 x 20..... 5.50

American Terne Plates—
IC, 20 x 28 with an 8 lb. coating.....$8.70
IX, 20 x 28 with an 8 lb. coating.....10.70

Seamless Brass Tubes—

List November 13, 1908. Base price, 18¢

Brass Tubes, Iron Pipe Sizes—

List November 13, 1908. Base price, 18¢

Copper Tubes—

List November 13, 1908. Base price, 21¢

Brazed Brass Tubes—

List February 1, 1911. 19½¢ ℔ lb

High Brass Rods—

List February 1, 1911. 14⅜¢ ℔ lb

Roll and Sheet Brass—

List February 1, 1911. 14⅜¢ ℔ lb

Brass Wire—

List February 1, 1911. 14⅜¢ ℔ lb

Copper Wire—

Base price, Carload lots mill 13¾¢

Copper Sheets—

Sheet copper hot rolled, 16 oz. (quantity lots) .....℔ lb 17¢
Sheet copper cold rolled, 1¢ ℔ lb advance over hot rolled.
Sheet copper polished 20 in. wide and under, 1¢ ℔ square foot.
Sheet copper polished over 20 in. wide, 2¢ ℔ square foot.
Planished copper, 1¢ ℔ square foot more than polished.

METALS—

Tin—

Straits pig .....℔ lb 50 @51

Copper—

Lake ingot .....℔ lb 14 @14
Electrolytic .....℔ lb 13⅝@14
Casting .....℔ lb 13⅝@14

Spelter—

Western .....℔ lb 6⅝@7

Zinc—

No. 9, base, casks...℔ lb 8½¢ Open...℔ lb

Lead—

American pig .....℔ lb 5½@5
Bar .....℔ lb 6¾@6

Solder—

½ & ½, guaranteed.....℔ lb 28½@28
No. 1 .....℔ lb 26½@26
Refined .....℔ lb 24½@25
Prices of solder indicated by private brand according to composition.

Antimony—

Cookson .....℔ lb...@
Hallets .....@10
Other brands .....9@

Bismuth—

Per lb $2.00@$2.2

Aluminum—

No. 1 aluminum (guaranteed over 99% pure), ingots for remelting.....21¢ and
Rods and Wire.....Base price
Sheets .....Base price

Old Metals—

Dealers' Purchasing Prices Paid in New York

	Cents.
Copper, heavy and crucible.....10.75 to 11	
Copper, heavy and wire.....10.50 to 10	
Copper, light and bottoms.....9.50 to 9	
Brass, heavy .....7.25 to 7	
Brass, light .....5.75 to 6	
Heavy machine composition.....9.25 to 9	
Clean brass turnings.....7.00 to 7	
Composition turnings .....8.00 to 8	
Lead, heavy 3	
Lead, tea 3	
Zinc, scrap 4	

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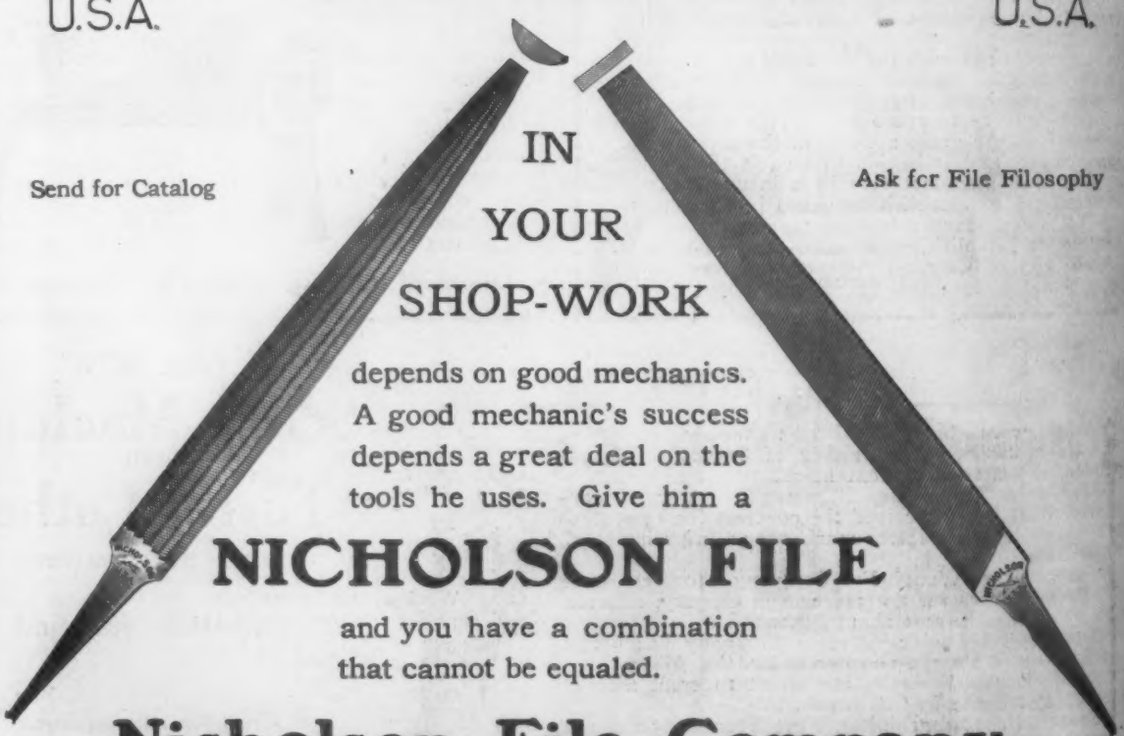

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